Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone, Sound Waves
PUBLISHED WEEKLY BY TELEPHONY PUBLISHING CORP.
608 S. Dearborn St., CHICAGO

H. D. FARGO, President and Treasurer
S. R. EDWARDS, Editor and Secretary

H. D. FARGO, Jr., Vice-President and Advertising Manager
D. C. SORENSEN, Western Advertising Manager

Entered as second-class matter September 4, 1908, at the postoffice at Chicago, Ill., under act of March 3, 1879.

Volume 97
Number 14

CHICAGO, SATURDAY, OCTOBER 5, 1929

Subscription — 10 Cents a Copy
$3 a Year U. S., Cuba and Mexico
$4 Canada, $5 Other Countries

VALUE OF TELEPHONE CONVENTIONS—COMMENTS ON MERGERS

A most important requirement of success these days is to keep abreast of the developments in one's own business. This applies with special force to public service companies that deal with all classes of people and must, therefore, be strictly up with the times.

This month (October 22, 23, 24, and 25) the United States Independent Telephone Association holds its national convention in Chicago, which event will afford all telephone workers an excellent opportunity to learn how to do their jobs more efficiently for their patrons and reap more reward for themselves. A four-day program is being prepared which will appeal to all branches of the telephone industry and should attract a large attendance.

No telephone man or woman who can be in Chicago that week, should fail to be present at this annual convention, for experience proves that attendance at these meetings yields definite benefits throughout the year following. It is always helpful to confer and exchange ideas with others engaged in the same business.

In its issue of October 26, TELEPHONY will present a complete report of the convention, which will, as usual, form a valuable record of the proceedings.

* * * *

State telephone associations have found that the holding of district meetings accomplishes a great deal in stimulaing their member companies to improve their business operations. The more district meetings held—and the larger the attendance—the greater has been the local companies' interest in raising the standards of service and bettering conditions generally. Enthusiasm and ambition to advance are the fruits of these get-together conferences.

The Chicago national telephone convention is a district meeting on a big scale. It is an occasion when telephone men and women from all the states gather to discuss the problems which affect the whole industry, and those who attend the sessions will be able to carry home with them food for thought that will help them in the months to come.

* * * *

Assistant Secretary Julius Klein of the Department of Commerce, issued a statement recently expressing satisfaction over the increase in America's foreign trade. He paid a well-deserved tribute to United States industry because it pays American workmen two or three times the wages that foreign concerns pay and yet is able to compete successfully with them in the markets of the world.

In commenting on Mr. Klein's statement a leading business review says that "striking examples of two of our largest industries, automobiles and telephones, demonstrate the contrast between the American and foreign markets and reveal just what opportunities lie ahead."

It then cites these facts: "Last January the peoples of the world were using 32,028,584 automobiles, trucks and busses. Over 89 per cent of these were American made. Over 80 per cent of the world's total — a proportion that includes 82.7 per cent of the world's passenger cars and 66.4 per cent of its trucks and busses—was circulating in the United States and Canada. Automobiles rank high in manufactured exports from the United States. The erection of foreign assembling plants abroad is the result of the insatiable demand for our motor products.

* * * *

"Next, the telephone! The world is brought close together by the wire that talks. Out of 30,990,304 telephones (January 1, 1928) in the entire world, the United States possesses about 60 per cent, Europe has about 28 per cent, and the remaining 12 per cent of the total is widely distributed.

The significant fact is this: Both automobile and telephone ownership is largely upgrade in the foreign field. The gain of automobiles in circulation in 1927 was 7.4 per cent; in 1928 it was 7.9 per cent. Telephones increased at the rate of over 5 per cent in 1927. It is inevitable that the exports of these two great industries which speed the world's communication will increase rapidly."

Business Mergers.

In connection with the present era of business mergers, it is really funny to observe the comfort and satisfaction which big business leaders get out of Henry Ford's statement that he would welcome a universal power trust.

Not so long ago these same busi-

ness leaders branded Ford a dangerous factor in industry. He declined to do business with the big banks and threw a scare into other manufacturers by paying wages so high that they said he would ruin the whole industrial structure. While conceded to be a phenomenal success, they called him a bull in the business china shop that would upset everything.

Now he is widely quoted as favoring a consolidation of power plants that will link up all the water power in the country under one control, and he is hailed by his former critics as a far-sighted genius whose opinions are entitled to the deepest respect. However, they do not always add a further comment that Mr. Ford made on the power merging proposition. Here it is:

"I am not afraid that a power trust would gobble up everything and everybody. There never will be anything without potential competition. Besides, the people will always assert themselves whenever things get out of balance, and they will effectively demand and get fair treatment."

* * * *

Speaking of the increasing trend towards more and bigger business consolidations the editor of Forbes Magazine utters this warning:

"Those having huge-scale consolidation combinations in mind would do well to act promptly because it is entirely possible, not to say probable, that public sentiment by and by will rise up and call a halt. Indeed, indications are that various states as well as the federal government will seek to pass laws aimed at consolidations before another year has passed.

Thus far no nation-wide hostility to mergers has been voiced, but among the rank and file of wage-earners the feeling is spreading that the gobbling up of properties too often leads to wholesale dismissals of old employes by new managements. Consumers have not yet been convinced from actual experience that mergers mean that economies are effected and handed on to the public. Unless merger-makers say it with lower prices, a rod will almost certainly be pickled for their backs."

Telephone Growth.

Reference was made in these columns recently to the fact that the relative percentage of annual telephone growth was smaller in the United States than in the other countries of the world. The reason, of course, is that the United States is already so much further advanced in telephone development that the other nations have more opportunity to make a percentage showing in their annual telephone growth. Their future increase will inevitably be larger because they have more ground to make up.

Under the caption, "The World Uses the Telephone," the Evening Journal of Berlin, Wis., in a recent editorial commented on this situation as follows:

"Though the United States has 60 per cent of the world's telephones and the rate of expansion continues about the same year after year, the percentage, as compared with the rest of the world, is slowly dropping, due to telephone development in countries which previously have been backward. This is a good sign. Development and perfection, through American engineering and executive genius, of world-wide communication have opened a hitherto closed door to better foreign relations, and understanding between peoples.

Americans want the rest of the world to progress. And as the number of telephones in foreign lands increases, the great web of communication wires that is binding the civilized world together grows in importance and possibilities for progress."

COMING CONVENTIONS.

United States Independent Telephone Association, Stevens Hotel, Chicago, October 22, 23, 24 and 25.

Independent Pioneer Telephone Association of United States, Stevens Hotel, Chicago, October 24.

Illinois Telephone Association, Springfield, Hotel Abraham Lincoln, November 20 and 21.

South Dakota Telephone Association, Watertown, Hotel Lincoln, January 14, 15 and 16.

The Location of Telephone Cable Faults

Various "Fault Locating" Methods Essential to Location of Faults in Telephone Cables—Three Classes of Cable Trouble—Preliminary Tests for Cable Faults—Some Effective Methods for Locating the Point of Trouble—Part 1

By B. C. Burden,
Lincoln Telephone & Telegraph Co., Lincoln, Neb.

The location of faults in telephone cables is a task that requires a thorough knowledge of all of the various "fault locating" methods; the factors that generally contribute towards trouble in the cable; and a considerable amount of good judgment. Attempting to locate cable trouble by the "hunt and find" method is too much like hunting for the proverbial "needle in the haystack."

Cable trouble can be divided into three classes, the most important of which is that causing complete service interruption to a large number of lines. Trouble of this nature usually occurs from moisture getting into the cable through sheath breaks, or because of severe mechanical injury to sheath and conductors. Moisture trouble generally requires immediate action so as to reduce the out-of-service time of the cable pairs involved.

The effect on service of complete cable failures is particularly severe, as the homogeneous area is usually affected by a complete individual cable failure. Subscribers attempting to use their neighbor's telephone when they find their own is out of order, also find the neighbor's line not working, and they are apt to unduly criticize the service as a result.

The second class of cable trouble is that which portends a breaking down of cable insulation with possible future complete cable failure. This kind of trouble indicates a sheath break at some point and should be located as soon as practicable in order to prevent the cable being later thrown out of service. Underground cable, especially "buried" cable, is prone to develop faults of this class.

Serious service interruptions may be prevented by checking up on any signs of insulation breakdown when they first appear. This type of trouble generally manifests itself by the tendency of the cable pairs to crosstalk or, in some cases, cross-ring. Periodic voltmeter checks of subscriber's lines will readily uncover this trouble.

The third class of trouble we will designate as "lost pairs." Due to lightning, defective splicing, mechanical failure, etc.,

cable pairs go open, shorted, or grounded between the main distributing frame and the point of termination.

Trouble of this class is not generally serious for in most cases only one or two pairs are affected at the same time and working lines can be transferred to good vacant pairs. However, if bad or lost pairs are allowed to accumulate in a cable, they will eventually decrease the available vacant pairs beyond the number needed for service requirements.

Kinds of Cable Faults.

The following faults may occur in telephone cables:

1. Grounds (one wire or a pair or both).
2. Shorts (two wires of a pair).
3. Crosses (between wire of different pairs).
4. Opens (one wire or both).

The faults enumerated, Fig. 1, may result from either physical contact between the conductors or from the impairment of insulation resistance due to the entrance of moisture. Faults resulting from the entrance of moisture into the cable are commonly referred to as "moisture cases," and those due to actual contact between the conductors as "contact cases." Moisture trouble can generally be detected by the fluctuating resistance of the fault, although this is not always true.

Mistakes in splicing give rise to another class of trouble which tends to create crosstalk and complicates records and maintenance efforts. Faults of this type are "split pairs" and "transposed pairs," Fig. 2.

Split pairs result from the cable splicer connecting a wire of one pair to a wire of another pair. Transposed pairs are caused by splicing a cable pair to a termination other than one to which it belongs. Transposed pairs require special record notes

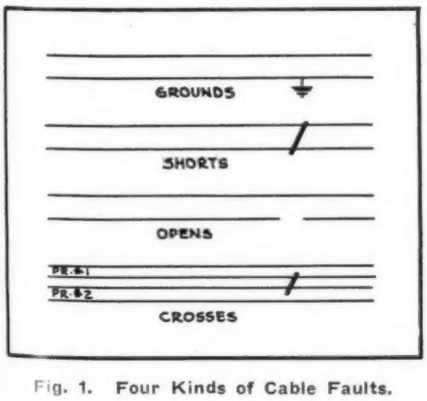


Fig. 1. Four Kinds of Cable Faults.

and create some confusion in maintenance work. Split pairs create excessive crosstalk in some cases, and also complicate record and maintenance work.

Cable Fault Location Methods.

The existence of faults in the cable plant is usually discovered either through reported or observed service interruptions or by routine tests.

A check of each subscriber's cable pair for grounds or high resistance shorts, made at periodic intervals of two months, will often prevent many cases of cable trouble by discovering a breaking down of cable insulation before the pairs involved are actually out of service.

In offices equipped with a wire chief's testing cabinet with terminating plug on

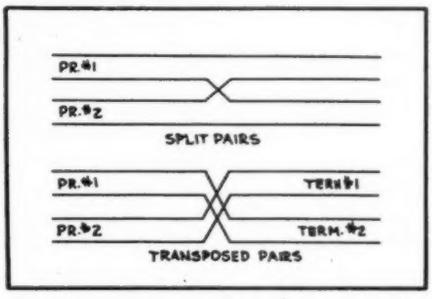


Fig. 2. Cable Faults Caused by Splicing Errors.

the switchboard, the tester is able to rapidly check a large number of lines. Overall insulation checks as suggested will of course, uncover many faults which will not be in the subscriber's cable pair.

A list of all trouble noted on the preliminary check should be made, and then a second test made with the subscriber's drop disconnected at the terminal from which it feeds. A battery voltage of 50 volts or over should be used in order to properly detect the existence of high resistance leaks.

For those offices not equipped with regular testing equipment, a portable voltmeter in conjunction with two 45-volt radio "B" batteries make a good testing arrangement.

It will not be possible to pick up leaks between the wires of a cable pair in some magneto plants, due to the subscriber's ringer coils which are generally directly across the line.

In checking common battery cable plant, grounds may be found on the grounded or tip side of the line, which would otherwise not show up by direct service interruption. It is, of course, desirable that these grounds be cleared, for they unbalance the line and are, therefore, a source of crosstalk.

All cable faults uncovered during these routine tests should be cleared if economically possible; and if not, they should be recorded on a "history card."

The purpose of the history card is to provide a permanent record of those cases of trouble which, because of their nature, cannot be cleared at a reasonable cost. They prevent future duplication of effort in connection with "carry over" cases of trouble. The history card should be numbered and the pair in trouble should be referred to the history card on the cable record by this number.

Preliminary Tests for Cable Faults.

When service interruptions are reported and a test indicates the trouble to lie in the cable plant, the first thing to do is to check the trouble and determine its nature; i.e., whether or not the trouble is "moisture" or "contact," and also its character as to ground, short, open, etc. It is usually possible to distinguish between these two kinds of trouble.

Moisture trouble will generally manifest itself as a grinding, rasping sound when a receiver in series with a battery is placed across the line or from line to ground. When checked with a voltmeter in series with a battery, moisture trouble will have a tendency to cause the voltmeter needle to gradually fall back toward zero, indicating the resistance of the fault is increasing during the test.

This is especially true when the cable pair in trouble had central office battery feeding out on it, just prior to the time of making the voltmeter test. The central office battery seems to reduce the resistance of the fault due to electrolytic action. Fig. 3 illustrates a method of keeping central office battery on the line when locating faults by the "tone induction method." The central office battery tends to keep the resistance of the fault lower than would otherwise be the case, thus giving a stronger tone in the pick-up coil.

Contact trouble when imperfect contact exists, may sometimes act very similar to moisture trouble when observed by means of a head set. Contact faults as a rule will give much lower resistance measurements than will moisture trouble.

Of the two methods of testing, the voltmeter method is to be preferred, for it gives a better quantitative indication of the character of the fault.

When the preliminary tests indicate wet cable, then a check of the insulation resistance of the various cable cycles should be made to localize the trouble in some particular cable. In the majority of cases it is possible by means of this check to

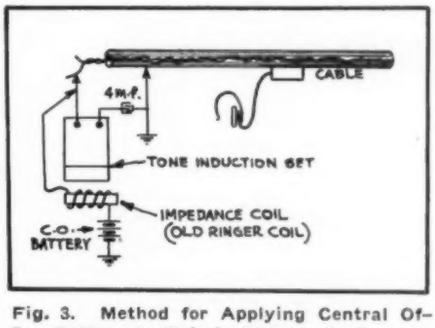


Fig. 3. Method for Applying Central Office Battery to Pair in Trouble in Connection With the Location of Moisture Trouble.

determine the individual cable which is in trouble. Oftentimes in common battery plants the reported cases of service interruptions on several telephones are sufficient to indicate the cable in trouble.

Methods for Locating Point of Trouble.

After the trouble has been localized in a certain cable, the next step is to locate the exact spot at which the trouble occurs. There are four methods that can be used

for the location of the exact point at which cable trouble occurs. They are:

1. Location by visual inspection of the sheath of the cable in which the trouble has been localized.

2. Location by Sectionizing the Trouble. This method consists in opening and testing one of the affected pairs at various points along the cable in trouble. This permits confining the trouble to a small section of cable, in which the exact spot at which the fault exists can be determined by a careful examination of the cable sheath. Obviously this method can only be used on moisture trouble and on aerial cable.

This method, of course, should never be used except where it is impossible to locate trouble by any other method with the means available. Access to the cable pairs for testing can be had either by blowing sleeves or by test cuts in the cable sheath. On an old pure lead cable plant which is due for replacement and which has no salvage value other than junk, this method is very efficacious in locating difficult cases of moisture trouble, especially where several faults exist in the same cable.

In making this kind of a test, one of the pairs in trouble should be tested with the voltmeter and battery and the resistance of the fault noted. A test cut should next be made on this particular pair at the mid-point of the length of cable in which the trouble is known to exist. The desired pair may be picked up at the point at which the test cut is made by means of "tone" applied to this pair and ground at the central office end.

After the pair is located, it should be cut and a test made from the central office to determine whether the pair is still in trouble. If the trouble is cleared by the cut, then the fault lies on the end away from the central office. Several test cuts will enable sectionalizing the trouble to a small length of cable, after which the trouble can be located by riding spans and inspecting the cable sheath carefully.

It is a good plan to check the end away from the office by means of a portable voltmeter and battery, at the time the pair is opened. This is done to make sure that the trouble really lies in the direction indicated on the central office test.

After the test cut has been made and the results noted, the pair should be respliced and the sheath soldered shut.

Tone Induction Methods.

3. Location of Faults by Tone Induction Methods. This method is one of the popular of the various methods of locating cable faults. The general plan consists of sending out a fairly low frequency alternating current over the cable pair in trouble, and then applying a "pick-up coil" connected to a head receiver to the outside of the cable sheath at various points along its length.

The tone can be heard in the receiver as long as the tester is between the source of the alternating current and the fault, but ceases after the fault is passed. It is assumed that the tone flowing out to the fault will be shunted back to the source at this point, hence there will be no inductive field to induce a voltage across the pick-up coil past the fault.

There are several different varieties of "tone induction" fault locators on the market. In general, they consist of an induction coil, a low-period armature, which is provided with make-and-break springs, and a condenser. A direct current source is necessary and usually consists of dry cells. The pick-up coil consists of a large number of turns of wire wound on a laminated core and provided with suitable binding posts for attaching a head receiver.

Operation of Fault Locator.

Some of the sets are provided with several taps on the induction coil of the tone set, which provide a variation in the output voltage. These taps are for the purpose of using the lowest voltage which will "lead out," thus keeping inductive interference to other working pairs in the same cable at a minimum.

In operation, the armature of the induction coil is attracted by the magnetic field set up by the direct current flowing in the primary winding of the induction coil. The movement of the armature opens a set of contacts which are in series with the primary winding and dry cells. This causes a collapse of the magnetic field, and the armature falls back, thereby closing the contacts and completing the cycle. The building-up and collapse of the magnetic field of the primary winding induces an alternating current in the secondary winding whose frequency depends upon the period of armature vibration.

This generated low frequency alternating current is connected to the pair in trouble and the pick-up coil applied to the cable sheath at different locations. The varying magnetic field set up by the alternating current flowing out towards the fault will induce a voltage in the winding of the pick-up coil which will be heard in the receiver. As the alternating current will be shunted back to the source at the fault, therefore no tone will be heard beyond the fault.

In the practical operation and use of "tone induction methods" it will be found that the tone does not always cease beyond the fault, but that it will "carry by" due to several different factors. If a considerable length of cable exists beyond the point at which the fault occurs, the capacity of this cable may bypass sufficient of the alternating current tone to give a false indication. The only remedy for this situation is to apply the alternating current source at a point which will leave the smallest amount of cable on the end beyond the probable point at which the fault occurs.

Usually there is a slight difference in tone beyond the fault which, under normal circumstances, can be distinguished. The lower the resistance of the fault, the more positive is the indication obtained when passing the location of the fault with the exploring coil.

There is also a tendency for the strand to carry the alternating current in both directions when testing for grounds, and this is apt to give a false indication. For this reason the exploring coil should always be held against the bottom of the cable sheath so as to be shielded as much as possible from the messenger current flow.

If all down guys are insulated with break insulators and the only ground of sheath and messenger is at the office, then this trouble will not exist. Most of the commercial cable fault locators are provided with instructions which stipulate the various methods of holding the exploring coil against the cable sheath to obtain the maximum indication.

A considerable difference exists as the coils are so designed as to eliminate as near as possible the sheath current and their successful operation depends upon holding the coil in certain relative positions. It is also necessary to move the pick-up coil over a foot or so of sheath in order to get maximum indications, as the twist and lay of the conductors in the cable will in some cases create neutralizing effects and no tone will be heard, even though current be flowing in the pair under test.

Moisture Trouble Location.

In the location of "moisture trouble," the best results are obtained by connecting the alternating current source to several pairs which show the heaviest shorts or grounds. These pairs may be either connected to the set and the return made via the ground, or they may be grouped into two separate bunches and tested the same as for shorts.

The proper method to use will depend upon the number of points at which the cable and messenger are grounded. In general, those plants having the cable and messenger insulated from ground at all points except the office ground, will respond best under the "ground test"; in other cases of several points of grounding the cable and messenger, the "short test" will probably prove best.

Improvised vacuum tube amplifiers have sometimes been used with good results for amplifying the weak, induced voltage in the exploring coil. Regular one or two-stage audio amplifiers similar to those used in radio work are suitable. The input transformer to the grid of the first audio tube should be of such design that it matches the output impedance of the pick-up coil.

The amplifier, because of its bulk, is usually located in a car or at the base of the pole and requires two men for its opera-

tion. One man applies the pick-up coil to the cable sheath, while the other listens for the indication. The use of the amplifier is especially advantageous on shorts and other faults in which the voltage induced in the pick-up coil is small.

It is possible to locate the splice at which pairs have been split during splicing operations by the following method: Connect together the four wires of the two pairs involved at the first point of termination. Connect the alternating current source at the office end of one of the two pairs. If the exploring coil is now applied to the cable sheath containing the two pairs that are split, two different effects will be noted.

If the pairs are straight out to point *A*, Fig. 4, then by moving the exploring coil along the sheath for several feet the tone will be heard at intervals of about six inches along the sheath. This indicates that the pairs are straight at this

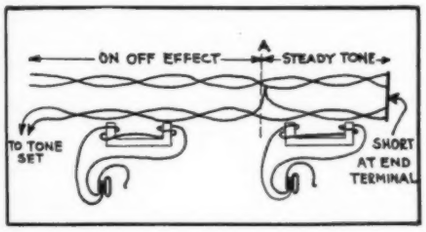


Fig. 4. Locating Split Pair Errors by Means of Tone Induction Methods.

point. The on-and-off effect is caused by passing over the points at which both wires occupy the same position. However, after the splice at which the wires are split is passed, the tone will be heard continuously, regardless of the position the coil occupies along the sheath. This same method can be used to detect split quads.

The "tone induction method" will, in general, give good results on all solid trouble, such as physical grounds, shorts, crosses, etc., in telephone cables; and if it is properly studied and understood, will give excellent results on "moisture trouble" although more difficulty will usually be experienced in making tests on "moisture trouble."

An excellent method for determining the limitations and capabilities of "tone induction methods" is to apply artificial faults, such as grounds and shorts, at intermediate terminals along a multipled cable. By connecting faults of various resistances in at these points, it is possible to determine by actual tests the minimum conditions which will enable fault location by the tone method.

Tone induction methods are also useful in locating shorts and grounds in concealed wiring, and can be used in some cases in the location of underground pipe structures.

Wheatstone Bridge Fault Locating.

4. Fault Location by Means of the Wheatstone Bridge. In many cases of cable trouble the resistance of the fault itself is too high to permit the use of the "tone induction method." Moisture trouble often dries out to such an extent that insufficient current from the alternating current source flows out through the fault to create a noticeable tone in the pick-up coil headset. Where the tone induction method does not give satisfactory results, fault location may be readily made with the Wheatstone bridge circuit

Before discussing Wheatstone bridge measurements on telephone plant, the theory of the "bridge circuit" will be discussed for the benefit of those not familiar with its fundamental principles.

(To be concluded.)

Many Exhibits to Be Made at National Convention This Month.

The United States Independent Telephone Association announces that over 50 different manufacturing and equipment companies have taken space in the big exhibit hall of the Hotel Stevens for the association's annual convention to be held October 22 to 25, inclusive.

This calls attention to the importance of the manufacturing group of the Independent telephone industry. From the very beginning of the telephone business the fortunes of the operating companies and the manufacturing companies have been closely linked. In the earlier years, the manufacturing companies were, in many instances, the promoters of telephone companies. This was at a period when capital was timid about investing in the infant industry.

Among the 50 companies listed for the coming national convention of the Independent industry are less than a dozen that were among these pioneers of the business. Each year, as the industry has grown, additional manufacturing facilities have been created either by the expansion of these pioneer plants or by the creation of new units designed to make a specialty.

Year by year, the number of companies has increased. This increase has been keeping step with the growth of the operating companies. That there are more manufacturers coming to the national convention this month than have ever before exhibited at a national telephone convention, is an indication of the strength of the operating companies, as well as the vitality of the manufacturing group.

In these days of constant changes in the telephone art, no operating company can afford to be unrepresented at such an exhibit as there will be at the Hotel Stevens the latter part of this month. All the latest improvements in telephone equipment will be displayed.

Every company that has been long in existence and desires to keep its place in the front line of successful companies, must keep itself in touch with the development of the plant, as well as in the development of the business parts of the industry.

The newer organizations into which men have come who are unfamiliar with the history and progress of the development of equipment, surely should have their heads of departments attend this exhibit and take advantage of the opportunity presented for familiarizing themselves with telephone equipment.

This coming convention is a real opportunity that should be taken advantage of by executive and plant superintendents.

Associated Telephone Utilities Co. Acquires Several Properties.

The Associated Telephone Utilities Co., Madison, Wis., has completed negotiations for the purchase of the Indiana Telephone Utilities Co., a Indiana telephone corporation, and the Union Telephone Co., a Delaware corporation. It was announced early this week in Chicago papers that the company had also acquired the Investors Telephone Co., of Chicago.

The operating properties controlled by the Indiana Telephone Utilities Co. consists of the La Porte County Indiana Telephone Co. and the Liberty Telephone Utilities Co.

The operating companies controlled by the Union Telephone Co. consists of the Lexington Telephone Co., Lexington, Ky.; the Platte Valley Telephone Corp., Scotts Bluff, Neb.; the Central Missouri Home Telephone Co., Sweet Springs Telephone Co., Missouri River Telephone Co., Warrensburg, Mo.; Holt Telephone Co., Holt, Mo.; LaFayette Telephone Co., Lexington, Mo.; L'Anse Telephone Co., Manistique Telephone Co., Manistique, Mich.; and Stronghurst Telephone Co. and the Inter-city Telephone Co., Stronghurst, Ill.

The operating companies controlled by the Union Telephone Co. provide telephone service to 81 communities through 56 central exchanges in the states of Kentucky, Nebraska, Wyoming, Missouri, Illinois and Michigan. Stations operated total in excess of 33,000 and the population of territory served exceeds 250,000.

The La Porte County Indiana Telephone Co. with headquarters at La Porte, Ind., serves that city and six other towns in northwestern Indiana. This company operates 6,319 stations, while the population of the community served is 20,690.

The Liberty Telephone Utilities Co. with headquarters at Liberty, Ind., serves that city, located in the east central part of the state. The stations operated total 908 and the population served is 2,000.

The Investors Telephone Co. operates 8,251 stations in Ohio and 5,502 in Michigan. Central exchanges are operated in Celina, Caldwell, Gibsonburg, Fort Recovery, Garretsville and other places in Ohio; and Harbor Beach, Laingsburg, Richmond, Yale and Deckerville in Michigan. The company maintains 213 miles of toll lines in Ohio and 72 in Michigan.

The Voice—How to Use It and Care for It

Here Is an Unusually Interesting and Informative Article Which Tells What Influences Tone of Voice and Ways Which Voice May Be Improved—Paper Read at Ohio Central Telephone Corp. Monthly Operators' Meeting at Lebanon

By Miss Evelyn Wilkerson
Ohio Central Telephone Corp., Lebanon, Ohio.

A horse was drawing a load of gravel along a city street; the pavement was slippery, and at the bottom of a little hill, horse and wagon stopped. The driver scolded and shouted. The horse became frightened and began to plunge wildly from side to side. This made the driver still more angry and his voice rose higher and louder. A crowd gathered. The boys in the street hooted.

The poor animal became more and more nervous, until it really seemed that he would never be able to draw the load up the hill. Suddenly, a woman stepped out from the crowd. Asking the horse's name, she talked quietly to him for a minute. Then she took hold of the bridle and said, "Come Jack." The horse gave one long strong pull, and the loaded wagon started forward.

It was not the man's words that frightened the horse, or the woman's words that made him calm. It was the tone of voice that each used.

The human voice is a wonderful thing. A dog can bark, a cat can mew, a bird can sing; but each of these animals uses its voice in a single way. Human beings alone can make their voices form words and sentences. We can tell one another our very thoughts. We can sing and laugh and cry. We can ask people to do what we wish, and can tell our friends how much we love them. Yes, the human voice is indeed a wonderful thing.

In the front part of the throat, where the wind pipe begins, is a little box called the larynx. If you place your fingers upon the outside of the throat just below the jaw, you can feel a hard bunch move up and down as you swallow. This is the outside of the larynx, or voice-box.

Inside the larynx there are two little flat bands, called vocal cords. Voice is the result of sounds produced by the vibration of the vocal cords. The vocal cords may be compared to the head of a drum, the membrane of which has been slit across the middle, leaving an opening through which the air passes. They are controlled by a series of muscles by means of which they can be contracted or relaxed.

During ordinary breathing the cords are relaxed and the opening takes the form of a triangle, but when the cords are made to contract, the opening is narrowed; and the air then driven through it causes the edges to vibrate, thus producing sound. The force with which the air is pressed through, determines the volume of the sound; the tension of the cords determines the pitch.

The tighter the cords, the more rapid the vibrations and the higher the pitch. The normal pitch of the voice depends on the size of the larynx. If this organ be small, the vocal cords are short and the voice high-pitched. For this reason, women's voices are higher-pitched than men's, and children's higher still.

The organs of speech are the lips, teeth and the tongue. When the voice comes out through the mouth, it is shaped into different kinds of sound by these organs. If the voice were not shaped into *speech*, as we call it, we should have a hard time understanding each other. All the sounds would then be alike, no matter what we were saying.

We know our friends by their voices, almost as well as we know them by their faces. Each one of us, has a special voice all his own—as different from all other voices as his face is different from all other faces. But though we were given a particular voice, we can make that voice a still more pleasant and attractive one.

The voice expresses feeling. "Expression" is defined as the outward manifestation of an inward emotion or feeling. "Impression" must precede and determine all expressions. Thus we see, that "expression" moves from within and outward.

Have you ever thought how loving and sweet a mother's voice is, when she is talking or singing to her baby? Have you ever noticed how unpleasant and unattractive a scolding voice is? Have you ever heard anybody whine?

We often come in contact with those who talk habitually on a very low pitch, mumble, growl, shout, talk through their nose, or commit other sins against good voice production.

The tones of the voice express or show how we feel. If people are always scolding, the scolding voice becomes a part of their nature; if they are always discontented, a whine shows itself in the voice. But people who are happy, who are pleasant, have pleasing voices—and pleasing voices help us to win friends.

Of course, we do not always feel happy, but if we think twice before we speak, we can keep out the whining or angry tone from our voices and make them sound pleasant. It is just as easy to form the habit of speaking in a low, sweet tone as it is to use loud harsh tones. Remember this: A pleasant word is easy to say, but a whining habit lasts many a day.

Excellent results toward good tone production may be gained by the practice of speaking and reciting on tones in the medium register (on the pitch *f*, *g*, or *a*) instead of using low chest tones, or forcing them into a shout on high pitches, and by employing high inflections to give color, sweetness, variety, animation, beauty, and the expression of mood and feeling. A good exercise is to recite lines of poems on gradually rising pitches.

Among the elements of success, two stand very prominent—a good appearance, and a pleasant and well-modulated voice. These largely make up first impressions, and no young person can have a better introduction in society or in business than an easy and graceful carriage, and a voice whose clear and pleasant timbre shows the results of intelligent direction and culture.

Clear and distinct enunciation, correct pronunciation, and good tone production are intimately concerned in one great essential—the art of personal expression. And it is through this great essential, that you as telephone operators come in contact with the patrons.

The telephone company is judged, in part, by the invisible personnel, who answer with a pleasant "Number, please?" and a polite "Thank you." Therefore, you should always strive to cultivate correct

Books; What They Give Us

Some books are our servants. They run errands for us. They are mental drudges. They bring us information; they tell us news; they keep us up-to-date; they equip us for our trade. But the great books are not our slaves; they are our masters; we sit at their feet to learn.

"Look," they say, and looking, we catch new visions of life's significance. "Consider," they say, and considering, we are captured by a new truth and our spiritual power is multiplied.

A man's life is made by the hours when great ideas lay hold upon him and except by way of living persons there is no channel down which great ideas come often into human lives than by way of books.—Harry Emerson Fosdick.

habits of personal expression for the sake of your position in the business world and in society.

Telephone Users of Government-Owned System Vote on Bonds.

During the past summer, an unusual interest in telephone matters has been shown by the subscribers in Port Arthur, Ontario, Can. The telephone system there is municipally-owned, and operated under the direction of a local public utilities commission.

Early in the spring, the commission advocated the purchase of new telephone exchange equipment. At that time, the commission stated that it was impractical to repair and add to the present manual equipment, which is of the old non-feature type and was manufactured by a firm which has been out of business for several years. With this thought in mind, it was announced that a plebiscite would be held early in September at which the subscribers would be given the opportunity of deciding what type of new equipment should be purchased.

Later, the local public utilities commission recommended to the city council the purchase of subscriber-operated equipment at a cost of approximately $248,000. The city council accepted this recommendation and proposed a by-law to be submitted to the tax-payers authorizing the issue of debentures to meet the cost of purchasing and installing this type of equipment.

Apparently, a large majority of the telephone users of Port Arthur had felt that something should be done to improve the quality of service, but this action on the part of the commission—of allowing them no alternative to the purchase of subscriber-operated type of equipment—aroused a considerable antagonism to the project.

During July and August, an active newspaper campaign was carried on, both for and against the proposed purchase. The Evening News Chronicle devoted considerable space to editorials in opposition to the proposal. In all fairness, it also published letters containing propaganda both in favor of continuing with the old equipment and also in favor of authorizing the issue of necessary debentures for the purchase of the subscriber-operated equipment.

During the same period, the local public utilities commission ran a series of more than 20 advertisements, most of which were of approximately one-quarter page size, in the Evening News Chronicle, urging the necessity for equipping the city of Port Arthur with a subscriber-operated telephone system.

The outcome of the plebiscite was that the proposal to add $248,000 to the city's indebtedness for telephone service was voted down by a majority of more than two to one.

Bell Officials Telephone to Australia via England.

America talked with Australia through regular telephone instruments for the first time on September 25, when officials of the American Telephone & Telegraph Co. in New York City exchanged greetings with the Australian telephone officials in Sidney. The occasion was an informal demonstration of the practicability of connecting the transatlatic telephone channel, operated by the American Telephone & Telegraph Co. and British Post Office, with the new short wave radio telephone channel operated by the British General Post Office between Great Britain and Australia, soon to be opened for commercial use.

The directive short wave transatlantic radio channel that is now in regular use for European service was used in the demonstration instead of the long wave channel so that the voices of the speakers were carried a total distance of 15,000 miles by the short wave system of transmission, interconnecting the wire systems of the United States and Australia.

From the office of President Walter S. Gifford of the American Telephone & Telegraph Co. calls passed over wire lines to the company's short wave transmitting center at Lawrenceville, N. J.; thence by radio to the short wave receiving station of the British General Post Office at Baldock near London, England; and thence by wire via London to the British government's transmitting station at Rugby, England, and again by radio to the receiving station of Amalgamated Wireless of Australia, near Sidney. The return path was again to Baldock; thence via Rugby to the Bell system's short wave receiving station at Netcong, N. J.

An interesting aspect for the conversations was that, taking place at four o'clock p. m., September 25, New York time, the clocks in Sidney read six a. m., September 26. The New Yorkers said "Good Night" and "Good Morning" came from Australia.

The conversations were between President Gifford of the American Telephone & Telegraph Co.; Dr. Frank Jewett, the head of the Bell Telephone Laboratories; Vice-President Arthur W. Page, American Telephone & Telegraph Co., and T. G. Miller, general manager long lines, A. T. & T. Co., and A. S. MacDonald of Amalgamated Wireless of Australia.

TELEPHONY was represented at another demonstration on September 30 by H. D. Fargo, Jr., at which representatives of the New York City newspapers were present.

"BARRIERS BURNED AWAY"

By Miss Anne Barnes,

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

Telephone operators are no longer restrained from speaking to their patrons in the way that seems the most natural to them when answering signals, replying to requests, and passing reports. They are glad that the old stereotyped phrases have passed into the discard, because some of them occasionally proved to be a real handicap in that they did not always clearly fit a given situation.

"A word fitly spoken is like apples of gold in baskets of silver."—(Proverbs.) Operators may now speak with "the tongue of the wise" (Proverbs) rather than the tongue of a trained parrot.

But, operators, please observe this caution: Do not be garrulous, lest it be said of you, "It would talk—Lord, how it talked!"—Beaumont and Fletcher. Rather, "Let thy words be few," and use "Great plainness of speech" (Corinthians), as you serve "Line upon line" (Isaiah).

Remember that "The law of kindness," and "A soft answer turneth away wrath,"—when spoken in "A still small voice" (1 Kings)—and is likely to create in your most impatient subscriber, "An understanding heart" (Kings).

Also remember that "In your patience possess ye your souls" (Luke).

Be "Slow to wrath" over "Every idle word that men shall speak," lest they become "A thorn in the flesh," causing you to forget for the moment that "A wholesome tongue" (Proverbs) does not "Weary in well doing."

Be "A cheerful giver" in your service and "Not grudgingly nor of necessity," lest you wound someone's feelings. "A wounded spirit who can bear" is not frequently found in a subscriber.

Do not attempt to be "A book of remembrance" for your subscribers. Rather, tactfully train them to refer to the book of "Numbers" before signaling you, so that you may give them a service equally good at all hours.

In conclusion, "Let all things be done decently and in good order" (Corinthians) and in the most natural manner.

Here and There in Telephone Work

The Magneto Exchange Repairman—Need for Protection (Ctd.)

By JOHN A. BRACKEN.

As electric light and power systems have developed into large and ever-increasing high voltage networks, with numerous generating stations feeding in at various points and with a large number of transformer and other stations having various power requirements, the need of as nearly a perfect means of protection between these various power circuits and telephone circuits becomes of considerable importance. Even with the most perfect scheme of protection there will be occasional interruptions to the telephone service under certain abnormal conditions.

The protection of telephone equipment has a two-fold purpose: first to protect the subscriber and the telephone employes against injury due to abnormal currents and voltages; and secondly to protect the central office apparatus, station apparatus and outside plant against damage from these abnormal conditions which can, by means of proper protective devices, be practically eliminated.

Crosses between telephone line wires and the wires of street railway companies and of electric light and power companies may result in an E. M. F. from 110 to 600 volts direct current, or from 110 volts to several thousand volts alternating current on the telephone circuits.

Serious results may also occur from induction due to the nearness of high voltage alternating current lines, although the construction of telephone lines should be such as to remove this source of trouble to a great extent.

A further source of danger and, of course, one probably more severe than any other, is lightning.

The simplest means of protecting a telephone line from excessive electric currents is by inserting in series with the line an abnormal current safety valve or protector, called a fuse. This usually consists of a fuse made of a metal alloy having a comparatively low melting point. It is sealed up in a fibre, wood or composition tube, and is of such size that it will carry only a definite amount of current without melting, thereby opening the circuit.

The protector fuse seldom comes into use in the case of lightning discharges, for the disturbing E. M. F. is of very short duration and its action so rapid that serious damage might occur before the fuse would have time to melt, and even then the current might arc across the open circuit. However, in the case of a cross or contact with a high voltage circuit, the current is likely to continue flowing after being grounded at the arrester; and to guard against this, the fuse operates.

The carrying capacity of the protector fuse should not exceed that of the telephone line wires, although it may be several times that of the telephone station or central office apparatus wiring.

In order to protect the telephone lines from high E. M. F., an arrester consisting of two carbon blocks, so separated by either porcelain, a small thin sheet of perforated mica, or other non-inflammable material as to form an open space is so mounted that one block is connected to the line and the other to the earth or ground.

On account of its very high oscillations, when lightning strikes a telephone line wire, the impedance of the line renders it much easier for the lightning discharge to penetrate this open-air space, and so escape to earth than to flow through any inductive apparatus, like ringers, receivers, or other coils in the circuit.

If each telephone line wire is protected by a carbon block, open-space cutout, a difference of potential in excess of about 250 volts between either wire and ground will cause the current to arc across the open space between the carbon blocks. This will burn or weld the two carbons together, forming a low resistance path to the ground for the current. The current will then increase and melt or, as we commonly say, "blow" the fuse or fuses, thus opening the telephone circuit.

The fuse is so located in the protector circuit that no foreign current (other than that normally supplied to operate the telephone) such as from a cross with a power line, etc., can come in contact with the telephone line between the fuse and the carbon block arrester. The fuses and carbon blocks are usually mounted on porcelain bases or mountings to form a complete protector. Some of these porcelain mountings are in one solid piece; others are formed in two pieces and attached to an additional mounting of sheet asbestos at the time of installation at the subscriber's premises. The purpose of the asbestos is to prevent a fire hazard, on account of certain types of protector fuses being so constructed as to allow the escape of inflammable gases; that is, when a fuse operates under high pressure, it often belches fire and would probably explode if not so made.

Any kind of telephone protection is practically worthless unless a good ground

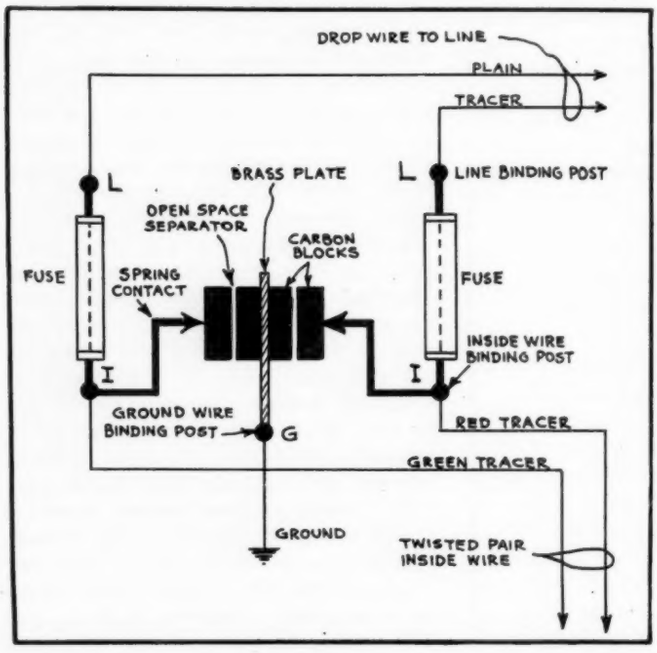


Fig. 1. Principle of Station Protector with Fuse Showing Its Connection in the Line.

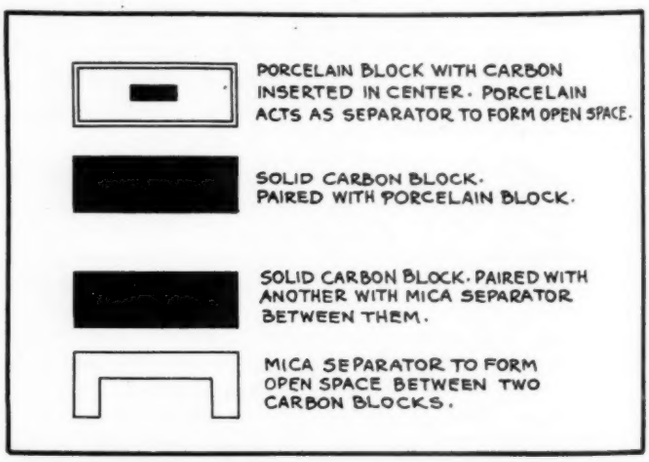

PORCELAIN BLOCK WITH CARBON INSERTED IN CENTER. PORCELAIN ACTS AS SEPARATOR TO FORM OPEN SPACE.
SOLID CARBON BLOCK. PAIRED WITH PORCELAIN BLOCK.
SOLID CARBON BLOCK. PAIRED WITH ANOTHER WITH MICA SEPARATOR BETWEEN THEM.
MICA SEPARATOR TO FORM OPEN SPACE BETWEEN TWO CARBON BLOCKS.

Fig. 2. Parts of the Carbon Lightning Arrester.

connection is provided, and failure to provide it is usually the direct cause of lightning and other damage. The ground connection to a protector is generally made with No. 14 gage, rubber-covered copper wire to a cold water pipe by means of a special clamp. If such a pipe is not available, a good connection is made to a gas pipe as near the ground as possible and between the supply and the meter. If no water or gas pipe is available, then a galvanized iron rod about one-half inch in diameter by five feet long, is driven into the ground with the head or top about three inches below the surface and connected to the protector ground wire.

Station protectors are, as a rule, located in the inside of the building at the point of entrance of the outside line wire in an accessible position but out of reach of children. The protectors are usually mounted in a vertical position so as to prevent the accumulation of dust between the carbon blocks and also to permit the dust produced by lightning or other discharges to fall out. It is also the practice to install station protectors on the outside of buildings in a special weatherproof galvanized iron mounting.

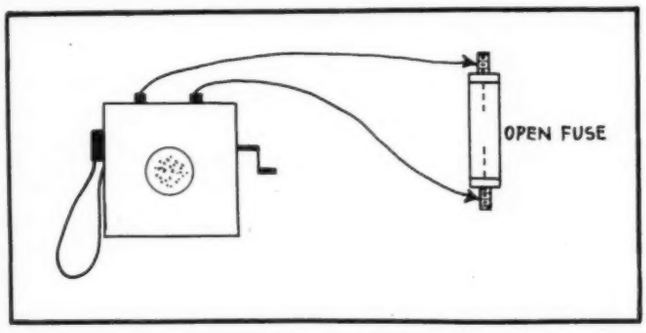


Fig. 3. Method of Testing Protector Fuses.

Some of the causes of protector troubles are: Fuses open, unsoldered, broken lugs, blowing, damaged in handling and transport, chemical action, factory defects, opening due to contraction of fuse wire in cold weather, loose connection at clips, etc.; carbon blocks becoming grounded account of proper action, dirt, heat, broken, moisture, vibration, improperly spaced blocks, wrong kind of separator between blocks, etc.; protector mountings broken, wet, missing parts, weak springs, loose binding posts (metal posts on the porcelain mounting to which wires are fastened), fuse clips loose, other loose connections, factory defects, damaged parts, etc.

Trouble in protector fuses can be tested for by connecting one clip of a magneto test set to one terminal of the fuse and the other clip to the other fuse terminal, and then turn the test-set generator crank. If the fuse is O. K., the crank will turn hard; if it is open, the crank will turn freely. Open fuses should always be replaced with new ones, and never strapped out with a piece of wire.

Protector carbons should be inspected for faults. If found badly burned or welded together, they should be replaced with new blocks. If only dirty, clean them with a stiff bristle brush. If the protector mountings or other parts are found to be wet or damp, change the entire protector.

Looking Glass Prairie Company First in Illinois Parade.

Home-coming week is always the occasion of a big celebration in the various communities which hold such events from time to time. During the past summer Mascoutah, Ill., observed a homecoming season which, of course, culminated in a parade. As prizes were offered for the best floats there was great rivalry among the local business men for the honors.

The Looking Glass Prairie Telephone Co. entered a float and, as might be expected, carried away the first prize. The accompanying photographs, taken in front of the exchange building, show the appearance of the float viewed from the side and the front. It is evident that the company officials and employes gave a great deal of thought to the type of float suitable for a homecoming. And it is evident that the girls from the operating room functioned just as well as a smiling reception committee on the float as they do in greeting callers with "The Voice With a Smile."

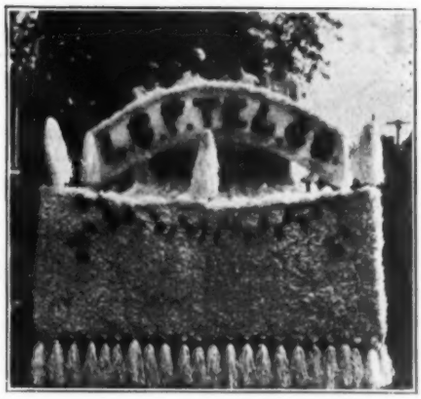
Phillip H. Mann, president of the Looking Glass Prairie Telephone Co., undoubteedly is proud of the showing made in the parade, as again demonstrating the ability of his organization to put over successfully whatever they start out to do.

All Underground Telephone Cable Between Albany and New York.

Work has been started on the construction of a new all-underground telephone cable system between New York and Albany, N. Y., the New York Telephone Co. recently announced.

Upon its completion several years hence, this new cable route will constitute a fifth telephone link between the metropolis and the capital city of New York state. Approximately 150 miles in length, it will be one of the longest underground cable routes in the East. Construction work is under way at several points along the line and it is anticipated that sections of the new route will be in operation by the end of the year.

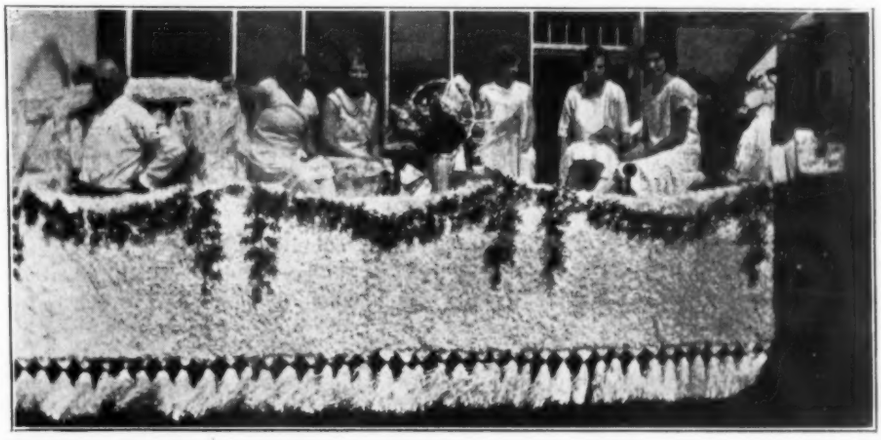
The constantly-increasing number of calls to and from upstate points has made necessary this enlargement of cable facilities, in anticipation of future growth. Beyond providing increased communication channels between the two cities the placing of the new cable underground will tend to reduce still further the possibility of service interruptions from sleet and electrical storms, etc.



Front View of Prize-Winning Float.

District Meeting of Up-State Association of New York at Monticello.

The Up-State Telephone Association of New York will hold a district meeting and traffic conference at Monticello on Thursday, October 10. Every telephone company in the district, both member and non-member, is urged by President J. G. Ihmsen to send representatives.



Side View of Float of Looking Glass Prairie Telephone Co., Mascoutah, Ill., Awarded First Prize in Parade During Homecoming Celebration.

Preventing Fire in the Telephone Plant

General Discussion of Fire, the Factors Involved in Producing It, Spontaneous Combustion—Some Common Causes for Fire—Important Rules to Follow in Regard to Prevent Fire in the Telephone Plant—Methods of Prevention

By John A. Bracken

While fire is invaluable to industrial and domestic life it is also, when improperly controlled, one of the greatest menaces to that life. From historical facts relative to mankind it might be said that human culture originated when it became known that fire existed, and that it could be used to needs of humanity.

When we consider the multitude of operations involving modern civilized life which can not be carried out except by the use of heat, we realize how absolutely essential fire and heat are and that today it would be almost impossible to get along without it.

Factors Involved In Producing Fire.

The existence of fire may have first been discovered in different places by various races of people through such natural phenomena as the ignition of inflammable substances, by lightning, or by volcanic eruptions; or perhaps, the discovery of fire may have resulted from the introduction of fashioning implements from stones, sparks being given off during the process of chipping the stone. In whatever manner fire was first discovered, the natural curiosity of human beings would sooner or later lead to the knowledge that it could be used for practical purposes.

The first important factor in producing fire is the selection for fuel of some suitable substance which burns. The term fuel is applied to any substance which can unite with the oxygen (a colorless, inodorous gas, which constitutes one-fifth by volume of the atmosphere) of the air with the production of heat, this being applicable to industrial and domestic purposes. Some substances can not unite with oxygen at all, probably because of the fact they already contain within their molecules all the oxygen possible. Other substances do not unite with oxygen at a sufficiently low temperature to make them valuable as fuel.

The second factor which is to be taken into consideration in producing fire, is the presence of oxygen. Any fuel will not produce its maximum quantity of heat unless a sufficient supply of air is available.

The last, or third factor of importance in the producing of fire, is the addition of sufficient heat to raise the fuel to its kindling temperature. Before a substance will unite with oxygen, its kindling temperature must be reached. This temperature varies with different substances, some of them requiring only a low degree of heat, and others requiring a much higher temperature in order to cause them to burn. The heat generated during the burning of a substance is called "heat of combustion."

Spontaneous Combustion.

Spontaneous combustion, which is the internal development of heat to the point of ignition, is caused by the chemical action of its own constituents when brought into contact with oxygen. The kinds of substances which may become ignited without the addition of heat from an outside source are numerous. All such substances, however, have one characteristic in common, namely, they all have the ability to oxidize slowly in the air.

Such oxidization reactions are accomplished by the evolution of heat; therefore, if substances which oxidize in the presence of air are stored in a place where the heat is not carried away as soon as it is produced, the temperature resulting from this chemical reaction may rise to a point at which the substance itself becomes ignited. This kind of fire is said to be caused by "spontaneous combustion"—that is, the act of burning proceeding from impulse or natural law, because there is no apparent cause for this act of bursting into flames.

Rags and waste that have been used to wipe oil and grease from automobiles, central office dynamos, motors, etc., are common types of material which are subject to spontaneous combustion, especially when they become saturated and then stored in a very poorly-ventilated place. This is a type of fire with which it is exceedingly difficult to contend, because of the fact that such fires usually start when no one is present to extinguish them.

As previously stated, heat is always generated during the process of oxidization. The heat developed during the oxidization of the oil-soaked rags or waste is sufficient to raise the temperature of the rags to their igniting point unless the storage place is well enough ventilated to carry away the heat as fast as it is produced. Coal, if stored in a poorly-ventilated place, is also liable to spontaneous combustion.

Common Causes of Fire.

The buildings and equipment of a telephone plant are more or less subject to the hazard of fire, the cause of which resolves itself into the following:

(1). Carelessness with matches, lighted cigarets, cigars, and pipes, permitting rubbish to accumulate in cellars, basements, attics, closets, lockers, etc.

(2). Use of open flames as a source of light, such as candles, oil lamps, unprotected gas jets, etc.

(3). Defective condition of gas and electric fixtures.

(4). Overheating of furnaces and stoves. Hot ashes from stoves or furnace stored in wooden containers instead of metal cans.

(5). Improper storage and improper use of such inflammable material as enter into the construction, operation and maintenance of a telephone plant; for instance, the storage of kerosene, gasoline, or alcohol, too near a source of heat; filling of kerosene or gasoline stoves, furnaces and torches while lighted or in the vicinity of an open flame.

(6). Thawing out frozen pipes with lighted newspaper, blowtorch, etc.

(7). Lightning.

(8). Electricity as, for instance, overheated central office switching equipment, etc.

(9). Sparks from locomotives.

(10). Incendiarism, explosions, etc.

(11). Sunlight.

Prevention of Fires.

The subject of fire prevention in the telephone plant is a big one and can only be handled by a persistent, systematic, educational campaign. It is a fact that fires, except those due to incendiarism, lightning and explosion, are preventable; and to be able to prevent fire in a telephone plant is of considerable more importance than to be able to extinguish the fire after it has started.

The most important feature in fire prevention is a system of regular inspection. As it is known that a fire is started from some source or other, preventative measures for all fires should be taken.

The possibility of fire cannot be entirely removed it is true, but the probability can be removed by a rigid inspection of all buildings and property so that conditions which are of a hazardous nature, or which present a serious menace to life and property, can be corrected.

Extreme care should always be exercised in the use of all sources of heat to prevent its application to other substances than that to be purposely applied. Cellars, basements, attics and closets of telephone buildings should be kept free from combustible matter; also the collection of rubbish should be avoided.

Stove pipes and furnace pipes should not be permitted to come in contact with a

partition. An open space should be maintained around them. Place metal protection under stoves. Allow ashes to cool before placing in cans to be removed. Care should be taken never to pile them against combustible partitions, or to place them in wooden barrels or boxes.

Clothing should be kept in well-ventilated metal lockers raised on legs at least four inches off the floor. Insist upon the use of these lockers and that they be kept clean and free from dust or useless material. Wet garments or other articles should not be placed on steam radiators to dry. This has started fires.

All open flames, gas jets or mantles, less than three feet from the ceiling should be guarded with a metal sheet having an open space above it. Closed bottom globes are best for gas mantles, in order to catch particles of heated carbon.

Oil lamps should be of metal or other unbreakable material. They should never be filled to the brim or allowed to burn entirely dry. The wicks be long enough to reach the bottom of the lamp and should never be allowed to become charred or hard.

Paper shades or cotton decorations should not be used on electric lights unless protected by some metal. Matches should never be used for purposes of seeing while inside of a building; use a flashlight instead.

Avoid starting bonfires near any buildings. Lighted cigars, cigarets, hot ashes from pipes, should never be thrown where they might start a fire. Store kerosene or gasoline in safety cans. Broadly speaking, all oil is dangerous and under no condition should it be kept in other than metal-covered receptacles of approved type.

Gasoline and other gaseous explosives should never be thrown into sinks, sewers, etc. Water tends to spread a fire that starts from kerosene or gasoline, and for this reason should never be used to put the fire out. Smother it with an asbestos blanket, sand, etc.

All electrical heating appliances, such as soldering irons, should be placed in metal holders when heated but not in use. If soldering irons are used for a short time only, it is best to disconnect immediately after using. Use fireproof muslin for wiping off the tip of soldering iron.

Electricity is a potent force of destruction, and it should be kept under control by the most up-to-date methods. Defective wiring, switches, fuses, sockets, etc., should be repaired immediately, or replaced.

Allow no smoking, except in rooms for that purpose; post conspicuous signs calling attention to this fact.

When a fire starts in a small telephone building, great care should be taken to prevent the opening of windows and doors in the room where the fire starts. This creates a draft which supplies the blaze with an excess of oxygen, and thus causes the fire to burn more rapidly than if there were only a limited supply of oxygen present.

In large central office buildings, one of the greatest danger points in case of fire is open shafts. Switchboard cable and wire runs, stairways or other shafts permit a free passage of air up and down, thus acting as veritable flues in case of fire. Cable runs and similar openings between floors should always be enclosed with thick pieces of asbestos or other fire retardent material.

If buildings housing telephone equipment are attached, there is more danger of fire spreading from one building to another than is the case where they are detached. Walls of fireproof material are most advantageous between all buildings of this sort.

In detached buildings, fireproof wired glass in windows where there is the greatest danger from the spread of fire from outside source, is generally considered one of the safest practices. Provision is also made in modern telephone buildings to prevent the spreading of fire by installation of iron shutters which may be closed either manually or automatically.

In the final analysis, it is cheaper to prevent fire in the telephone plant than to pay the damages afterward. The precautions that are taken depend upon individual problems. In no two cases are they just alike. They depend upon conditions, and constant watchfulness is the price of immunity from fire.

Activity From Illinois District Meetings

Last Two District Meetings of Illinois Telephone Association at Carlinville and Murphysboro Close Best Series of Meetings Held by That Association—Attendance This Year at All Six District Meetings Numbers Nearly 900

Two hundred and sixteen telephone people attended the last two district meetings of the year, held by the Illinois Telephone Association at Carlinville and Murphysboro, on September 18 and 20. The total attendance at the six district meetings held this year by the association, as shown by the signed registration cards, was nearly 900. This does not include the guests, city officials, newspaper men and others who attended the noon luncheon and program which is an established feature of these meetings.

The size and importance of the district meetings this year in Illinois make it evident that the telephone industry realizes and appreciates the value of united effort. These district meetings are splendid rallying places for social and business activities. Any one who attends them comes away with a developed sense of civic responsibility, renewed loyalty and enthusiasm for the association, together with the knowledge that the telephone interests are continuing the work that is fundamental to the growth and prosperity of our industry.

The first Independent telephone exchange in the state of Illinois was established in Carlinville in August, 1893, by B. M. Burke. Mr. Burke was an honorary guest and speaker at the noon luncheon.

Carlinville General Meeting.

The Carlinville meeting opened at 9:30 a. m. by W. E. Bown, district manager, Illinois Central Telephone Co., who greeted the delegates to the conferences. He was followed by Louis Pitcher, president of the Illinois Telephone Association, who spoke on the timely subject, "Suggestions About Publicity."

Mr. Pitcher has been a constant advertiser in the Dixon, Ill., newspapers for over ten years, and he related some very interesting and educational experiences with his advertisements. For example, Mr. Pitcher said that copy and ideas for some of the most effective advertisements used by the Dixon Home Telephone Co. were based upon suggestions which were solicited from the company employes.

One of the outstanding discussions of the meeting was initiated and led by Walter D. Knowles, general manager of the Illinois Central Telephone Co., who spoke on the subject of "Importance of Everlasting Vigilance in the Development of Small Exchanges." Mr. Knowles presented some recently compiled figures and facts concerning telephone saturation, sales possibilities and the results of actual canvasses made in small exchange areas, all of which were used as evidence and proof of the importance of everlasting vigilance in the development of small exchanges. His talk created much valuable discussion.

M. B. Smith, plant superintendent of the National Telephone & Electric Co., Clinton, followed Mr. Knowles with samples and illustrations of field sales talks and arguments which he had successfully used in canvassing for new business. He

stated that in some cases he called on a prospect as many as nine times before he sold him telephone service. Mr. Smith also emphasized the necessity and economy of keeping the old subscribers as well as the advantages of securing new subscribers.

The transmission engineer of the Illinois association, T. De Witt Talmage, spoke briefly on the subject, "For Better Public Service." The speeding up of the mail service and the improvements in the telegraph service were discussed and pointed out as competition for the communicating public's dollar. It was stated that if the telephone industry is to keep ahead in the race for this dollar, a superior grade of telephone service must be furnished to the subscribers.

The relationship between this condition and the advantages of preventive maintenance routines were taken up one by one and analyzed. It was pointed out that by properly directing efforts during optional time, a man can get ahead of his trouble. But if he waits until trouble is reported to him, the trouble will often get ahead of him.

The noon-day luncheon was served in the main dining room of the St. George Hotel by the ladies of the First Christian Church. Mayor P. O. Landon gave the address of welcome. Others who spoke were J. E. McClure, editor of the Carlinville Democrat; T. J. Surman, president of the Chamber of Commerce; P. K. Renaker, president of the Rotary Club, and B. M. Burke, the pioneer Independent telephone man of Illinois.

Mr. Burke stated he was operating an exchange several months before the original Bell patents expired in January, 1894. His exchange was the first Independent one in Illinois, and, with the possible exception of Fort Smith, Ark., was the first in the country.

The feature of the luncheon program was a commercial department playlet entitled, "An Experiment in Courtesy," which was unusually well presented by the Mattoon operators under direction of Miss Florence Welch. The playlet was highly educational, and with it was mixed in enough humor to make the entire skit a pleasant lesson on how and how not to handle subscribers at the commercial office.

Walter G. Printy, service engineer of the Illinois Commerce Commission, opened the afternoon conference with an interesting and practical summary of the "Outstanding Irregularities Found by the State Telephone Service Inspectors." His talk led to the asking of many questions and the discussion which followed took up the major portion of the afternoon.

In fact, the open forum was so heated and lengthy that the three reels of moving pictures, which were to be shown with the association's portable motion picture projector, were not displayed because of the lateness of the hour. The pictures were on the subject of construction practices and illustrated the solution of some construction problems.

The Carlinville Traffic School.

The traffic school of instruction was attended by 60 operaors representing toll centers and tributary offices.

The day's program was opened by A. J. Parsons, secretary and treasurer of the Illinois Telephone Association. Mr. Parsons extended a hearty greeting to all those present, then in some detail outlined the association activities throughout the territory, told of the different departments connected with the association, and of the functions and responsibilities of each department representative.

R. H. Brooks, district traffic superintendent of the Springfield district of the Illinois Bell Telephone Co., made a very interesting talk in which he expressed his personal interest in the district meetings held monthly by the association and enthusiastically encouraged that advantage be taken of all opportunities offered to attend these meetings. Mr. Brooks stated that in his opinion they are one of the best sources of developing a uniform language among operators which is most essential in order that uniform service might be given.

T. De Witt Talmage, transmission engineer for the association, was most interesting in his talk regarding the work he is doing and of the results he hopes to obtain. Mr. Talmage brought out many ideas which heretofore operators have felt little or no responsibility in.

He particularly emphasized the need of cleaning switchboard plugs and also the care that should be given the operators' telephone sets. He closed his discussion by reciting a poem, visualizing a telephone very much in need of attention.

Miss Mary Martin, division toll instructor from Chicago, was the class instructor on "Ticket Record Work." Miss Martin started out with actual demonstration of a most simple kind of call being filed, taking it step by step until it finally developed into the most complicated of affairs (as is sometimes experienced in handling calls), instructing as she went along on the proper handling and disposition to be made in each case.

Of particular interest was the emphasis given to the handling of collect calls. Many of the offices are still handling collect calls on the two-ticket basis. This has frequently resulted in the call being billed, or at least timed, at both the originating and terminating offices and has also resulted in some cases in the call not being timed at either the calling or called point.

The present operating practice for handling these calls is that it be handled on single-ticket basis, timed at the originating office and forwarded to the terminating office for billing. This procedure avoids considerable waste of operators' and toll circuit time and does not in any way complicate the billing of the call.

Miss Florence George, voice instructor for the Illinois Bell Telephone Co. at Springfield, was in charge of the next class on "Voice Technique." Miss George demonstrated several drills and then called on her class for exercises of the jaws, lips and tongue, which if properly developed will result in the "Voice With a Smile" without any effort to the individual.

Mrs. Agnes Davis, chief operator, Illinois Consolidated Telephone Co., Taylorville, was in charge of the class on tributary operators' instruction. She reviewed with tributary operators the instructions for handling long distance calls, and in her discussion brought to mind many valuable ideas which, if properly applied, will result in a better service to tributary operators.

After the noon luncheon, the classroom discussions were resumed. Miss Lola Wiggins, chief operator at Carlinville and the hostess of the day, gave a demonstration on proper handling of equipment. Particular mention was given the equipment set up for her use for demonstration for she was in a position, by actually handling the equipment, to show the class the right way.

The next class was an instruction session on methods of determining routes. This class was conducted by Mrs. Loretta Cusick, district toll supervisor, Springfield. The operators were thoroughly drilled on the proper procedure for routing, especially in routing of long line traffic.

The rest of the afternoon was devoted to a round-table discussion on operating methods. The operators were divided into three groups. The first table was made up of tributary operators with Miss Irene Goodall, traffic supervisor, Illinois Telephone Co., Jacksonville, as instructor. Mrs. Mercedes McKibben, chief operator, Springfield, was in charge of the second table and instructed toll center operators. The third table was in charge of Miss

(*Please turn to page* 30.)

Successful Public Relations

Successful public relations usually result primarily from having the job of each person in the organization carefully defined and understood by all.

If every worker, whether he be in the ranks or in a supervisory capacity, knows exactly what he is expected to do and feels an individual responsibility for it and a pride in it, a long step toward perfect organization, which develops good will, has been effected.—Andrew W. Robertson, Chairman of Westinghouse Electric & Mfg. Co.

me Saver—
led By The Strowger Dial

THE smooth functioning of the Panama Canal and the efficient handling of the great boats passing through its locks are a source of justifiable pride to the engineers in charge of its operation. The perfect control and timing of ship movements relies largely upon rapid and accurate inter-communication between every section of the Canal Zone.

Since 1926, the entire Panama Canal Zone has been under Strowger Automatic Dial operation. The network has some 3,000 lines distributed among four main offices, Cristobal, Gatun, Pedro Miguel and Balboa, with a small unit at Gamboa and Strowger P-A-X's at Fort Clayton and Fort Davis. In spite of the difficulties from insects and dampness which face telephone operation in tropic climates, Strowger operation in the Canal Zone has more than justified the supervising engineers' selection of it as the most efficient type of trouble-free, rapid and accurate telephone service obtainable.

Automatic Electric Inc.

Manufacturers of

STROWGER AUTOMATIC DIAL TELEPHONE AND SIGNALING SYSTEMS

Factory and General Offices: 1033 West Van Buren Street, Chicago, U. S. A.

Sales and Service Offices in All Principal Cities

EXPORT DISTRIBUTORS

For Australasia . Automatic Telephones, Ltd., Sydney
For Canada . Independent Sales and Engineering Co., Ltd., Vancouver
Elsewhere . The Automatic Electric Co., Ltd., Chicago

ASSOCIATED COMPANIES

American Electric Company, Inc. . . . . Chicago
International Automatic Telephone Co., Ltd., London
Automatic Telephone Manufacturing Co., Ltd., Liverpool
The New Antwerp Telephone & Electrical Works, Antwerp

UTOMATIC
STEMS

When writing to Automatic Electric Inc., please mention TELEPHONY

(*Continued from page 26.*)

Gladys Underwood, chief operator at Clinton. Local operators were instructed at this table.

At the close of each discussion scheduled on the program, a 15-minute open discussion was planned. Several discussion leaders had been appointed beforehand, thus assuring the instructors of some questions. This procedure proved quite successful in that many of the other girls entered into the discussion and many important and profitable ideas were exchanged. The instructors also were able to discuss with the operators those items in technical operating which were of real information and value.

The traffic conference was in charge of Mrs. Loretta Cusick, district toll supervisor, Illinois Bell Telephone Co., Springfield.

Murphysboro Men's Conference.

The men's conference at Murphysboro was held in the Elk's Home. The opening address was made by G. L. Mays, general manager of the Illinois Commercial Telephone Co. He welcomed the delegates to the conferences and suggested that questions be asked on any subject in the open forum.

Louis Pitcher, president of the Illinois association, repeated his talk given at Carlinville on the subject of advertising in the telephone business and what may be reasonably expected from this constructive policy. He also discussed a few phases of construction practices in which the Dixon Home Telephone Co. is engaged at the present time.

Frank V. Newman, general commercial superintendent of the Illinois Commercial Telephone Co., Madison, Wis., gave a very interesting and instructive talk on "Commercial Objectives." Mr. Newman drew liberally on his vast and colorful experiences in the telephone business and passed on many helpful and workable ideas and methods for better commercial department activities.

The concluding talk in the morning session was made by T. De Witt Talmage, transmission engineer of the association, who spoke concerning the eliminating of maintenance defects that cause excess transmission loss. He stated that in line with the association's policy to be of the greatest possible service to member companies, new testing equipment has been added to the transmission engineering department which would broaden the scope of this service department and result in locating certain plant defects more rapidly.

Mr. Talmage distributed copies of the bulletin entitled "For Better Public Service Inspect the Operator's Telephone Sets Regularly." This explains how to keep the operators' sets in good working order so that subscribers will receive the kind of service to which they are entitled and for which they are paying.

The luncheon was served in the First Christian Church by the ladies of the church, and it consisted of one of the finest chicken dinners the writer ever encountered in attending district meetings for the past four years in Illinois. Song sheets were distributed and an old-fashioned songfest was indulged in. Mayor Jos. H. Davis, of Murphysboro, gave a splendid address of welcome. Julian Emlen presented a violin solo—almost a solo, because a dog had followed someone into the banquet room and lay unnoticed under the table until the music of the violin caused him to make a duet of the solo.

Miss Pauline Weihn, a very talented and clever actress, gave a most enjoyable reading. The girls' quartet consisting of Clara Auer, Jean Morris, Leah Davis, Velma Thomas and accompanist, Jule Spiller, rendered "Kentucky Babe" in the most modern manner. Attorney Lawrence A. Glenn, brother of United States Senator Glenn, gave a humorous talk. The commercial department playlet entitled "The Maker and Breaker of Public Relations" was well presented by four girls from Carbondale, DuQuoin and Murphysboro, the Misses Elsie White, Edna Stock, Pauline Weihn and Mary Louise Brown.

Conditions Influencing Transmission

The afternoon session of the men's conference consisted of a projectional galvanometer demonstration and display of maintenance defects causing trouble in a connection. G. R. Francis, transmission engineer of the Illinois Bell Telephone Co., gave much useful information and many practical pointers on the way to provide a grade of transmission which will permit the subscribers to talk to anyone, any place, at any time.

He discussed, among many other items, reflection losses which muffle, jumble up and cut off words. He stated that the number of contacts, such as soldered joints, screws, nuts and bolts, etc., in a local connection between two subscribers in a multi-office area, excluding the interoffice trunk circuit, is 363. This large number of contacts clearly shows the numerous points at which trouble may occur or be introduced. This number of contacts is further increased to 560 contacts if two P. B. X. boards are in the same connection.

Mr. Francis demonstrated the effects of troubles in various types of equipment and circuits and told how to locate them in order that the telephone company will be in a position to offer connections with a minimum amount of transmission loss and thus give the best possible service to subscribers.

J. S. Weisz, of Madison, Wis., closed the afternoon session with an interesting talk concerning the objects of the magazine, "The Mouth-Piece," which is published and distributed monthly in the interests of the employes of the Associated Telephone Utilities Co. and its subsidiary companies. Mr. Weisz urged all employes to take an interest in the welfare of the magazine and cooperate with the editorial staff by sending in contributions for publication.

Traffic School at Murphysboro.

The traffic school at Murphysboro was in charge of Mrs. Loretta Cusick, district toll supervisor of the Illinois Bell Telephone Co., Springfield. It was attended by 55 operators.

A. J. Parsons, secretary and treasurer of the association, opened the session by extending a greeting and a word of welcome. He told of the purpose of the meetings held by the Illinois association, emphasizing the importance of group thinking, of group acting, in order that a uniform method of operating might be in effect in all communities.

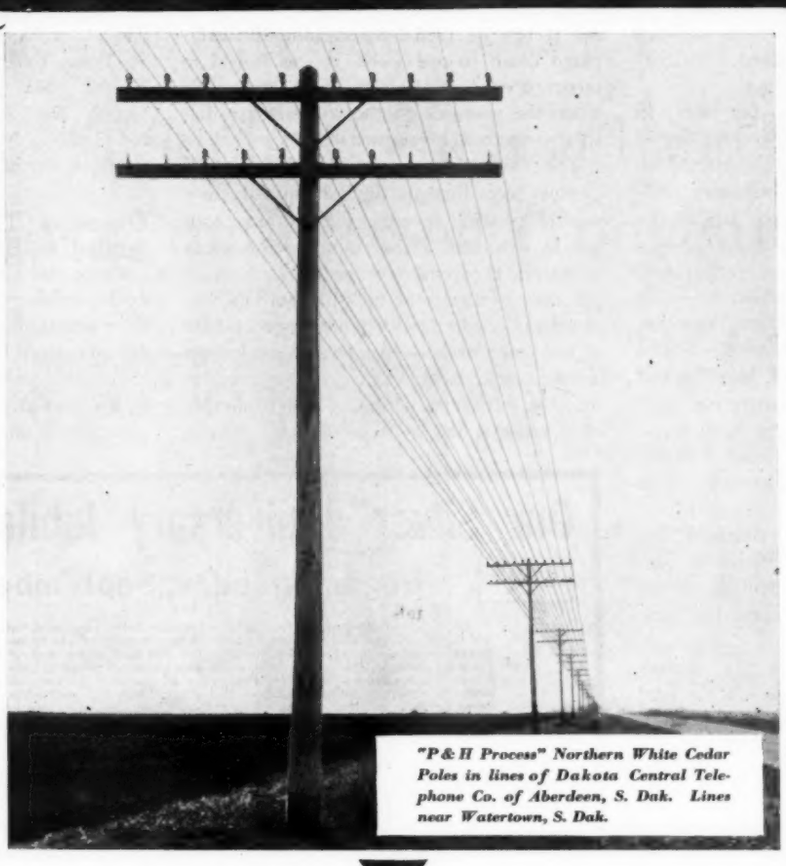
Owen G. Jarboe, traffic superintendent of the Illinois Commercial Telephone Co., talked regarding the growth of this company. He stated that he would, before returning to the general offices, visit some of the 80 properties in the state of Illinois recently purchased. He pointed out the value of group meetings of this kind and stated that many mutual benefits are derived from the interchanging of ideas.

"The Benefits Derived from Cleaning Switchboard Plugs" was a topic interestingly discussed by T. De Witt Talmage, transmission engineer of the association. Mr. Talmage was particularly anxious to make sure that each chief operator present received a copy of the pamphlets recently issued by the association on the cleaning of switchboard plugs and the care of the operators' telephone sets.

L. N. Peterson, district traffic superintendent of the Illinois Bell Telephone Co., Alton district, talked of the importance of correctly routing traffic, the proper use of repeater equipment and the attention which should be given to transmission. Every effort should be made, Mr. Peterson stated, to establish long distance calls on circuits, using facilities to result in satisfactory transmission, thereby resulting in satisfactory service to the customers.

Miss Anna Jungers, traffic supervisor, Murphysboro, conducted the first class in "Ticket Record Work." Many important phases of ticket work were covered and the conditions actually demonstrated on sample tickets, so that a correct interpretation would be obtained from the discussion.

The class in "Voice Technique" was conducted by Mrs. Agnes Thompson, voice instructor, Centralia. The benefits to be derived from good voice work, both to the company and to the employes, were outlined. Mrs. Thompson, by actual demonstration and drilling, developed with her audience some of the methods used to avoid a lazy tongue, a rigid jaw, etc. She



"P & H Process" Northern White Cedar Poles in lines of Dakota Central Telephone Co. of Aberdeen, S. Dak. Lines near Watertown, S. Dak.

P&H

"P&H Process" Poles *meet Modern Demands*

Engineering practice today determines the correct size pole to carry a required load and provide the desired factor of safety . . . the proper correlation of load and pole size.

In "P & H Process" Poles, you will find a size under each length which is adequate for the calculated load. It is simply a matter of selecting the correct top size or class. With the calculated load in pounds, we can give you the correct size of pole to use.

Prompt shipment on all Cedar Pole needs—
Northern White Cedar or Western Red Cedar

"Still in the Lead"

PAGE AND HILL CO.

MINNEAPOLIS. MINN.

New York, N. Y., 50 Church St.
Boston, Mass. 733 Public Service Bldg.
Chicago, Ill., 19 So. La Salle St.
Kansas City, Mo., 517 Pioneer Trust Bldg.
Dayton, Ohio, 854 Reibold Bldg.
Omaha, Neb., 711 Electric Bldg.

When writing to Page and Hill Co., please mention TELEPHONY.

suggested that the operators, when they returned to their own offices, might practice these drills, until they were satisfied that the faults which interfered with correct speech had been corrected.

The third class of the day was in charge of Mrs. Amy Jennings, chief operator, Zeigler. Mrs. Jennings instructed on proper methods of handling tributary traffic, both at the tributary office and at the toll center office.

After luncheon the school reconvened, the first class of the afternoon being in charge of Miss Minnie Baber, assistant traffic supervisor at Lawrenceville. Miss Baber discussed the proper handling of equipment by actually demonstrating at a switchboard the wrong and the right ways. Many benefits were derived from this discussion because of the completeness of its presentation.

Mrs. Loretta Cusick, Springfield, instructed on the proper methods of determining routes, especially drilling on the procedure to be followed in routing long line traffic.

Following this discussion, the classes were divided into three groups. In the first were toll center operators; in the next, tributary operators; and in the last group, local operators.

The round-table instruction work was in charge of Mrs. Iva Pulley, chief operator, Marion, who instructed local operators. Mrs. Edith Winn, chief operator, Benton, instructed tributary operators, and Mrs. Mable Garber, chief operator, Cairo, instructed the toll center operators.

A 15-minute open discussion followed each instructor's presentation. Arrangements had been made for discussion leaders and this method was most successful in leading others to ask questions. It is appreciated that the question-and-answer method of instruction is the most satisfactory, for by this means those items are discussed which will be of some real value to those who are not sure of the proper interpretation to give the instruction.

Lincoln, Neb., Company's One-Week Silver Anniversary Drive.

The Lincoln Telephone & Telegraph Co. celebrated its silver anniversary this week with a revenue development campaign that was well supported by the entire force of workers. The object was to give the public information as concerns all types of telephone equipment and service; to more thoroughly saturate the territory with every kind of telephone equipment and service; to increase the monthly revenue through the sale of every revenue producing item known to the company and to place in service idle plant equipment.

The campaign required weeks of planning, and was well organized. Every person in the employ of the company was asked to enter into the spirit of and to join the campaign. A year ago a plan differing in a number of respects, but with the same object in view was carried out successfully, and it was hoped to overtop the record of 1928. By keeping the campaign down to one week, it was hoped to secure a concentration of effort impossible when the energies of the workers are dissipated over a longer period.

The exchanges were divided into nine groups according to the amount of their monthly station revenue for the year ending July 31 last. In arriving at the quota of monthly revenue for each exchange, 1 per cent of the total monthly station revenue was used. Quota points were valued at five cents each. This put all exchanges on the same basis, regardless of size, in that the exchange with the larger number of prospects had a large quota to meet. Particular emphasis was placed on sales of a monthly revenue type.

A prize will be given to the exchange in each group compiling the highest number of points as determined by the plan. The prize in turn will be given by the exchange to the employe in that exchange, regardless of department, on the basis of points credited from sales made. Where a tie results, two prizes are given.

In order to stimulate interest at the close of each day's solicitation, each exchange summarized all contracts obtained and prepared a record of sales which showed the number made, the class of service sold, the monthly rate of each sale and the monthly revenue. This was telephoned to the office of the district manager before 9 o'clock each morning following and each day's record mailed later to the manager in order to provide a proper check.

The district office, in turn, reported within an hour by telephone to the commercial superintendent at Lincoln, the total monthly resulting from the previous day's activity. Detailed reports were forwarded to him at the close of the campaign. Each exchange was advised by him from day to day of the progress made at all other exchanges.

Special newspaper advertisements were used during the campaign to prepare the public for it and to support the sales activities of the employes. Each exchange was supplied with data respecting quotas. Lincoln, Hastings and Beatrice, the three largest exchanges were put in Group No. 1; York, Fairbury and Nebraska City in No. 2. Six exchanges were placed in Group No. 3, seven in No. 4, 13 in No. 5, 22 in No. 6, 26 in No. 7, 41 in No. 8, and seven in No. 9.

Our Silver Anniversary Jubilee Campaign
1904
Begins Monday, September 30.
1929
More than 1500 employees of the Lincoln Telephone and Telegraph Company will put forth a united effort September 30th to October 5th, to acquaint their friends with those telephone services which they are not now using and which they could use to their advantage . . . . . This week has been set aside to celebrate the Company's Silver Anniversary . . . twenty-five years of furnishing dependable telephone service under continuous management . . . . . You will undoubtedly be called upon by some telephone employe during next week. In the meantime ask any employe about the usefulness of an extension telephone . . . the value of a long distance call, or additional telephone facilities.
Lincoln Telephone and Telegraph Co.
"A Nebraska Company 1 Serving Its People"

Sample of Advertising Used in Support of Campaign by Employes for Increased Revenues in Connection With Silver Anniversary Conducted Recently by the Lincoln Telephone & Telegraph Co., Lincoln, Neb.

Overseas Telephone Service Extended to Birthplace of Columbus.

Turin and Genoa, Italy, have been added to the points reached from North America by transatlantic telephone service. Thus the birthplace of Columbus now has direct telephone connection with the continent he discovered in 1492. Following his discovery, two months were required to carry the news of it to his home. Today the human voice travels by telephone from Havana to Genoa in a fraction of a second.

Milan, the first Italian city to be included in the scope of the overseas service, was connected with America by telephone last month. Through the extension of the service to Turin and Genoa, three of the most important cities in Northern Italy may have direct connection with practically all telephones in the United States and Cuba, and the majority of those in Canada, and Mexico. The service is available throughout the 24 hours.

More than 100,000 telephones, serving a combined population of nearly 2,000,000, are thus added to the 28,500,000 telephones already linked by transatlantic service.

Telephone Service Improvements Under Way in Northern Ireland.

At the end of 1928 there were 21,404 telephones installed and in use in Northern Ireland, according to U. S. Consul R. M. Brooks, Belfast, Ireland, an increase of 1,205 over the preceding year. Of the telephones installed all except 4,514 were for business use.

The province is served by 133 exchanges and it is planned to provide small automatic centers in various rural districts. In Belfast work is under way to provide an automatic system for the city, including certain nearby suburbs.

Telephones near at hand... for Comfort and Convenience

By the dressing-table ..in the library, sun porch, guest-room ... wherever they will save steps and time, and add comfort to living

Of the many features which contribute to the livability and smartness of the modern home, few are more truly convenient than *enough telephones*, properly placed to give the greatest possible ease in the use of the service.

It is so desirable, nowadays, to have telephones in all rooms frequently used. Then important tasks need not be interrupted, nor long trips made to distant parts of the house, whenever an outside call is made or answered.

In many residences, the dressing-room suggests itself as an appropriate location. A telephone here not only saves steps and time, but tends to prevent annoying delays when one is preparing for bridge, travel or the theater.

And other rooms are equally suitable. The exact locations vary according to the requirements of different households. Your local Bell Company will be glad to survey your home, and recommend the telephone arrangements best suited to your needs. Just telephone the Business Office.

In emphasizing the true comfort and convenience that complete telephone arrangements bring to the whole house, the Bell System calls special attention to appropriate rooms for telephone locations. The above advertisement, featuring the dressing-room, is appearing this month in a group of general magazines.

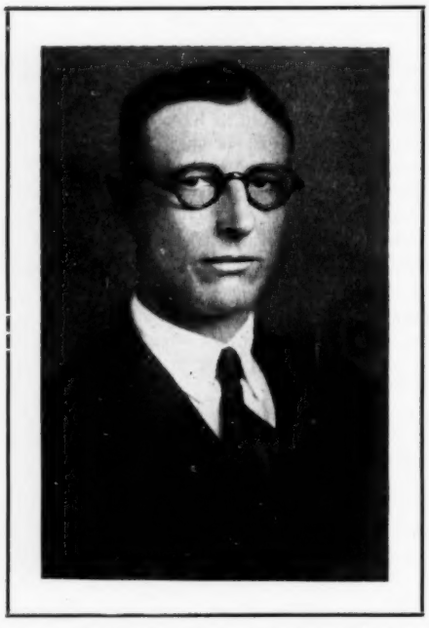
Jasper, Ind., Has New Switchboard

Installation of Full-Featured Kellogg Switchboard for Southern Indiana Telephone & Telegraph Co. at Jasper, Ind., on June 21 Assures Subscribers of Modern Service—Description of the New Exchange Building and Equipment

By H. W. Hogue,
Manager, District No. 1, Kellogg Switchboard & Supply Co.

Real cooperation between the citizens of Jasper, Ind., and the Southern Indiana Telephone & Telegraph Co. has resulted in one of the finest and most modern telephone systems in the Middle West. The latest improvement, which assures the subscribers of modern service, is the installation of a new, full-feature Kellogg switchboard on June 21.

Realizing that the quality of its telephone equipment is an indication of the progress and prosperity of any community, the Southern Indiana Telephone & Telegraph Co. made its choice of a suitable board after much careful consideration. The Kellogg switchboard was chosen as best suited to serve the thriving industrial center of Jasper.



E. S. Welch, Secretary and General Manager of Southern Indiana Telephone & Telegraph Co., Took Active Part in Planning Rehabilitation of the Jasper, Ind., Exchange.

The fact that more office desks are manufactured in Jasper than in any other city in the world justifies its title, "The Desk City." The four desk factories located there produce about 2,000 desks weekly. A large office chair factory, a novelty furniture factory, and a plant producing tops and panels are among the other leading industries.

A large sawmill and a veneer mill produce much of the raw material used in the other woodworking plants. Some of the other industries located in Jasper are a glove factory, two flour mills, a grain elevator, an ice factory, a soft drink plant, and a printing plant.

With an industrial life such as this, it is easy to understand that among its population of 3,500 people, few, if any, idlers are found. The citizens of Jasper are home-loving people, and the residential section of the town is noted for its beautiful residences, schools and churches.

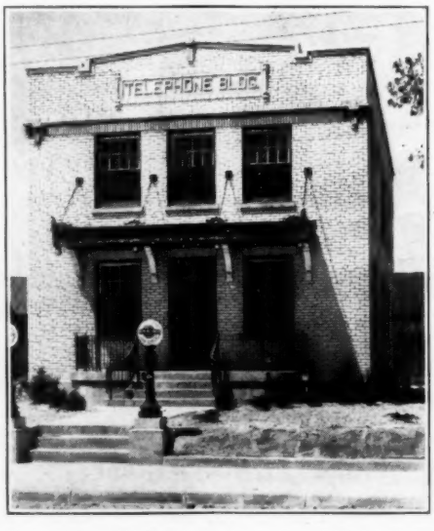
The telephone history of Jasper dates back many years to the days of the Dubois County Telephone Co. when a hand-cranked magneto board was the height of modernity. When the Southern Indiana Telephone & Telegraph Co. took over the exchange, it immediately began to revolutionize the entire system. The first move was the construction of a new plant.

The completed telephone home is typical of its use—housing the two important factors that keep the wheels of business moving—the telephone and telegraph offices. The entire building is constructed of brick, both inside and outside, and is practically fireproof. The walls are of cream-colored brick, combined with an attractive contrasting red brick terra cotta effect.

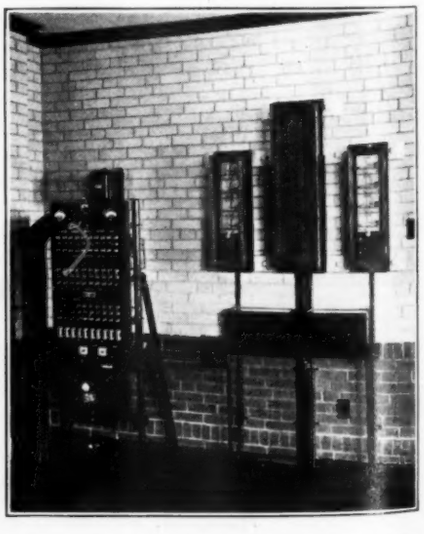
In planning the construction of the new exchange, E. S. Welch, secretary and general manager of the Southern Indiana Telephone & Telegraph Co., made certain to include every modern improvement and convenience that would contribute to the pleasantness and efficiency of the telephone house. Next to the public lobby is the cashier's office, manager's office and the workroom.

L. C. Griffitts, President of Southern Indiana Telephone & Telegraph Co., Seymour, Operating Jasper, Ind., Exchange.

On the second floor is the operating room and a brightly-furnished restroom. Light, air and comfort were specially emphasized in the furnishing and planning of the operating room. Approximately half of the public lobby is occupied by the Western Union Telegraph office.

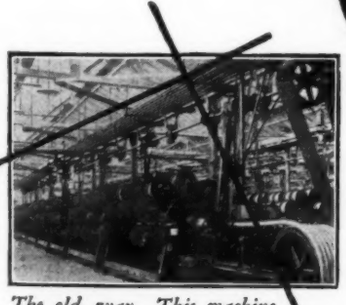


New Exchange Building at Jasper, Ind., Which Also Houses the Western Union Telegraph Office.

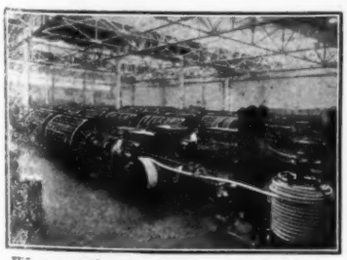


The Power Equipment in the Jasper Exchange of Southern Indiana Telephone & Telegraph Co.

The best cable shop in the country . . . ..but *it wasn't good enough*



The old way. This machine for stranding cable was the best in the country, but—



Western Electric engineers worked out a new way, stranding cable more quickly, more safely, more economically.

IN equipment and methods the Western Electric telephone cable plant of 1927 set the pace. But that didn't satisfy the company's manufacturing engineers. They put the plant in the test tube of critical judgment—and they came out with something even better.

It meant revising processes, redesigning machines, rebuilding a factory which occupied sixteen huge structures. But it was worth it!

Whether making cable or any of the 10,000 items of telephone apparatus, Western Electric seeks till it finds the better and more efficient and more economical way. As manufacturer for the Bell System this is its share in good telephone service.

Western Electric

MAKERS OF YOUR TELEPHONE

Relay Rack and Distributing Frame of the Jasper, Ind., Exchange.

Public Lobby in New Telephone Building at Jasper, Ind.

Coincident with the completion of the new telephone exchange, the Kellogg Switchboard & Supply Co. put the finishing touches on the new board contracted for by the Southern Indiana Telephone & Telegraph Co., and the cutover in Jasper was soon made. The board is a two-section, four-position, common battery multiple switchboard. Position No. 1 is arranged for toll; position No. 2 for rural, and positions Nos. 3 and 4 for local service. The board is equipped for 400 common battery local lines, 80 rural lines and 20 toll lines.

A great deal of the credit for the success of the Southern Indiana Telephone & Telegraph Co. is given to its officers. They are continually on the alert, watching for improvements for the betterment of telephone service throughout the various communities served by the company. The Southern Indiana Telephone & Telegraph Co. has recently spent thousands of dollars on outside equipment in Jasper, putting in approximately three carloads of vitrified clay conduit and two carloads of cable of various sizes.

L. C. Griffitts, president of the company, started in the telephone field about 1897 and has remained with that work since that time.

E. S. Welch, secretary and treasurer, has had a wide experience in the telephone field. He started at the bottom and has worked up to an important position. His telephone activities began back in 1901 with the old Cumberland Telephone & Telegraph Co., Nashville, Tenn.

The manager of the Southern Indiana Telephone & Telegraph Co. at Jasper, Mr. Himsel, had a great deal to do with the installation of the new equipment, and through his efforts the people of Jasper have received the benefits of good service.

Another important cog in the smoothly running telephone system is J. E. Cline, general plant superintendent for the Southern Indiana Telephone & Telegraph Co. Mr. Cline had complete charge of the construction work at Jasper that gives the subscribers the modern service made possible with the new Kellogg equipment.

Prices in the Metal Markets.

New York, September 30.—Copper—Steady. Electrolytic spot and future, 18c. Iron—Steady; No. 2 f. o. b. eastern Pennsylvania, $20.50@21.50; Buffalo, $17.60@18.50; Alabama, $13.00@14.50. Tin—Easy, spot, $45.00; future, $45.87. Lead—Steady; spot New York, 6.90c; East St. Louis, 6.70c. Zinc—Steady; East St. Louis spot and future, 6.80c. Antimony—8.50@8.62c. Quicksilver—$1.24.

Private Telephone System of Oil Company in Texas Field.

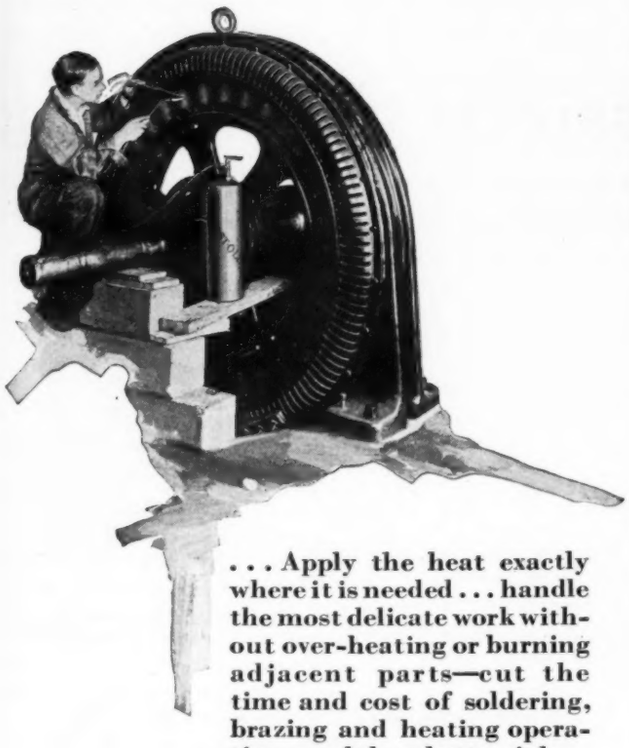
Various oil companies in the operation of their properties in the producing fields make extensive use of the telephone. Most of them have their own private telephone and telegraph system with switchboards at various points and connecting lines between them.

The Freeport Sulphur Co., which has its producing fields at Freeport, Texas, has about 200 telephones with three switchboards, and several small 10-line P. B. X.'s in plants and where there is enough business between points requiring direct and quick service.

The lines are of No. 10 B. & S. or No. 17 bronze twisted pair wire, except where they run between the switchboards. Then

Front View of Recently Installed Kellogg Full Feature Switchboard in Jasper Exchange of Southern Indiana Telephone & Telegraph Co. —A Corner of the Operators' Restroom in the Jasper Exchange.

Any Flame You Want With Prest-O-Lite



. . . Apply the heat exactly where it is needed . . . handle the most delicate work without over-heating or burning adjacent parts—cut the time and cost of soldering, brazing and heating operations and do a better job.

Blow-torch operators prefer Prest-O-Lite. They like its hot, concentrated, easily controlled flame. They like its convenience, its instant readiness without pumping and preheating.

Ask your local Prest-O-Lite Gas Distributor to demonstrate this equipment for you or write us direct for complete information.

Any one of 15,000 Prest-O-Lite Exchange Stations can supply you quickly with Prest-O-Lite.

THE PREST-O-LITE CO., Inc.
Appliance and Small Tank Division
Unit of Union Carbide and Carbon Corporation

UCC

NEW YORK: Carbide and Carbon Bldg.
SAN FRANCISCO: Adam Grant Bldg.
IN CANADA: The Prest-O-Lite Company of Canada, Ltd., Toronto

Prest-O-Lite GAS

D·C OUTPUT

up to 1 ampere
30 volts

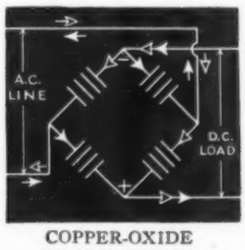
from a Rectifier that never wears out

THE copper-oxide principle used in Westinghouse Rectox Rectifiers takes advantage of the peculiar electrical properties of copper coated with a layer of copper oxide. In a unit properly formed in this way electricity can pass in one direction only. There is no electrolytic or chemical action. The unit does not wear out. It provides a method of rectification that operates without maintenance cost, without failure, without the need for attendance or supervision.

Using copper-oxide rectification, the Rectox illustrated here trickle-charges 12 or 24 volt batteries. Slide band resistors make it possible to vary the charging rate from 50 milliamperes up to one ampere. It is not limited, however, to battery charging applications and may be used wherever one ampere 30 volts maximum is required from 115 volts, 50-60 cycles, a.c.

An insulating type transformer makes this Rectox suitable for any service where the lead circuit should be electrically insulated from the supply. Mounting studs are provided for switchboard mounting, or the charger may be installed on shelf or floor. Send in the coupon for complete information.

RECTOX



COPPER-OXIDE RECTIFICATION

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
Sales Offices and Service Shops in All Principal Cities
East Pittsburgh, Pa.

Westinghouse

Westinghouse Electric & Mfg. Company,
Rectifier Section,
East Pittsburgh, Pa.

Please furnish me more information about Rectox Copper-Oxide Rectification.

Name.....City.....

Address.....State.....

they are either in No. 19 gage lead cable, phantomed, or of No. 10 B. & S. copper open wire. Under a river, No. 13 B. & S. copper phantomed lead submarine cable is used. The circuits are phantomed wherever possible.

The two producing fields of the Sulphur Co. are 17 miles and 3½ miles, respectively, from the city of Freeport in different directions. The Southwestern Bell lines come in the Freeport for long distance and local service in the city.

J. A. Rose is chief engineer of electric power and telephones for the Sulphur Co. and E. D. Selsmer looks after the telephone maintenance.

Constructs Six Company-Owned Exchange Buildings This Year.

The Lincoln Telephone & Telegraph Co., Lincoln, Neb., is just completing the construction of its sixth exchange building this year. The preliminary budget for 1930 calls for a continuation of this policy of owning its buildings and constructing them of standard types, all with the same fundamental floor plans, but changed in each case to fit the convenience of customers and workers.

The newest building is at Fairmont, and will be completed the middle of this month. New equipment will be installed, and the plant cut over about the first of the year. The building at Nelson has been remodeled, and the service made common battery with a new switchboard.

The other buildings that have been built by the Lincoln company are located at Syracuse, Exeter, Gresham and Dorchester.

What the Commissions Are Doing

Up-to-the-Minute News Regarding the Activities of State and Interstate Commissions, Courts and City Councils in Matters Concerning Telephone Companies—Summary of Commission Orders and Schedule of Telephone Hearings

Propose Direct North to South Toll Line in Idaho.

Investigation into the possibility of constructing a direct north to south Idaho telephone line was ordered last month by the Idaho Public Utilities Commission.

A petition for such a line was forwarded to the commission by the Grangeville chamber of commerce, which protested that telephone communication to that city had to be routed via Lewiston and Spokane, involving a distance several hundred miles longer than the direct line.

The proposed line would be constructed between New Meadows and Whitebird and thus would connect the Mountain States Telephone & Telegraph Co. on the south and the Pacific Telephone & Telegraph Co. extending to Grangeville on the north.

C. D. Franklin, commission engineer and his assistant, John Turner, have made a study of the costs of the proposed line, which would extend 60 miles between the two points. It was proposed that the two telephone companies each build half of the line.

Indiana City to Appeal from Commission's Order.

Notice has been filed with the Indiana Public Service Commission by the city of Worthington, Ind., that the city has taken an appeal from the commission's telephone rate order of August 2 to the circuit court of Greene county, seeking an injunction against the increased rates made effective September 1.

In the notice the commission has been advised that the city will attempt to block rate increases granted to the Southern Telephone & Telegraph Co. The increases have raised the cost of service on a single line business telephone to $4.25 a month and on single line residence telephones to $3 a month.

Commission allowances of a rate valuation of $52,000 on the property giving the company a 7 per cent return and a 4 per cent depreciation, the city contends, are unlawful and unreasonable and were procured "by fraud and other unlawful methods."

Toll Rates Now Being Charged Between Indiana Exchanges.

Standard Indiana Bell Telephone Co. toll rates will be charged both ways between a number of telephone exchanges and the Northern Indiana Telephone Co. of North Manchester, Ind., according to an announcement made by W. J. Smith, vice-president and manager of the Northern Indiana company, recently.

Exchanges affected include those at Akron, Mentone, Atwood, Leesburg, Fulton, Macy, Roann, Chili, Denver, Millwood, Sidney, Pierceton, Tippecanoe, South Whitley, Urbana, Twelve Mile, Grass Creek, Bourbon and Bippus.

The Indiana Public Service Commission granted the permission establishing toll charges after the Northern Indiana company had filed a petition with the commission charging that various companies were not collecting toll charges and the Northern Indiana company was losing money as a result. It asked that standard rates be established between all of the companies and exchanges. Several of the companies involved notified the Northern Indiana company that free toll had been used for many years and objected to toll charges being levied.

Just what the results of this order will be is problematical as a considerable number of subscribers, in each of the exchanges affected, had ordered their service discontinued unless they have free service. But the outcome will probably be the return to the use of telephone service, eventually, by all who have hertofore had telephones.

Free toll line service has proved unsatisfactory in many respects, principal among which is that the lines are always so busy being used in visiting that people desiring the use of the connecting lines for necessary purposes are denied the service because of congested lines.

Hearing on Reopening of Petition for Increased Rates.

Reopening of the petition of the Decatur County Independent Telephone Co., Greensburg, Ind., for an increase in rates is indicated by a notice issued by the Indiana Public Service Commission which set October 2 as a date for a hearing. The company filed a petition for a rate increase April 23, but shortly afterward postponed the hearing until a later date.

The company about a year ago was granted an increase by the commission, but since then the increase has been deemed insufficient by the telephone officials.

The last increase, effective in September last year, called for $1 increase on private business lines, 50 cents on party business lines; $1 increase on residence private and party lines and 25 cents increase on five-party lines. Rural subscribers were given an increase from $1.75 to $4.50 on various services.

Indiana Citizens Will Build Own Plant If Rate Fight Fails.

Citizens of Portland, Ind., who assert their city council has authority to fix rates of the Home Telephone Co., are preparing to build a municipally-owned telephone plant if their fight against rate jurisdiction by the Indiana Public Service Commission fails, according to James R. Fleming on September 27, who was at the statehouse in Indianapolis.

Mr. Fleming made arguments before the full membership of the public service commission, attacking the commission's jurisdiction over the Portland telephone rate on the ground that the company never had surrendered its franchise, granted by the city, to accept an indeterminate permit

Cook Type "O" Sub-Station Protector

Weatherproof—Fireproof—Indoors or Outdoors

A completely enclosed sub-station protector, that may be easily mounted indoors or outdoors. It offers perfect protection and excellent facilities for line, instrument, and ground wire connections.

Base and back is a single piece of heavy white glazed porcelain, so made that surface leakage is eliminated.

The zinc cover fits tight to the sides and bottom of the porcelain, the galvanized bracket acts as a stop. Fuse clips are phosphor bronze. 5-ampere fuses are standard. Lightning arresters ground on a copper ground strip. Carbons and celluloid dielectrics or True Gap dischargers.

The Type O Protector is made for different lengths of fuses.

This is a small, neat, compact protector, of sturdy construction, high quality at an unusually low price.

Sample on Request

COOK ELECTRIC COMPANY

2700 Southport Ave. CHICAGO

Crapo

GALVANIZED PRODUCTS

The pure zinc coating on *Crapo* Galvanized Telephone Wire and Strand is ***non-peeling, non-cracking.*** Even when subjected to splicing, twisting or bending, this protective coating remains uninjured.

That is why *Crapo* Galvanized Products are outlasting all others in actual service. That is why users, year after year, are reducing maintenance costs to new low levels....

Crapo Galvanized Telephone Wire and Strand can be obtained from representative Jobbers. Insist upon *Crapo* quality! You can identify it by the *Crapo* Tag....

Indiana Steel & Wire Co.,
Muncie, Indiana

TELERING

For Central Office and PBX Ringing

ONE REED!

ONE CONTACT!

IDEAL WAVE FORM

ORDER ONE ON TRIAL.

NO OBLIGATION TO KEEP

Fully Guaranteed

Converts 60 Cycle Lighting Current to 20 Cycle Ringing Current.

POSITIVELY NO RADIO INTERFERENCE

Very low current consumption.

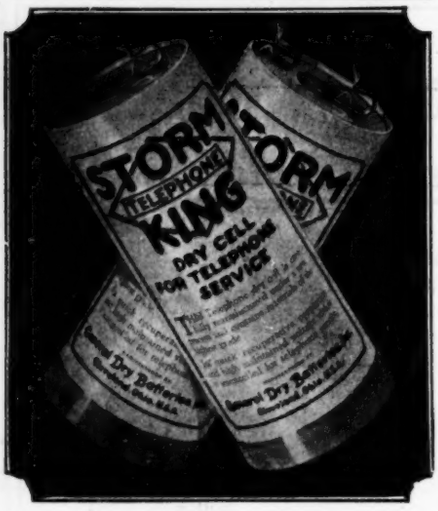
Model EX-3 has been proven the ideal ringing machine by hundreds of satisfied users.

Price $44.00 — F. O. B. Elyria
IT PAYS FOR ITSELF

Sold by Leading Telephone Distributors

Telkor, Inc., Elyria, Ohio

(Write for booklet)



Keeping Faith
with **THE PUBLIC**

MAINTAINING the finest service possible is but the every day duty of a telephone company in carrying out its contract with the public.

"Keeping faith" simply means "use good judgment in the selection of your equipment."

STORM KING batteries have developed a new insulating material, more highly absorbent than any other, which will retain the chemical solution much longer than anything so far developed. The result is the longest service life ever developed in a telephone battery and this in turn means substantial savings to telephone companies in cutting down renewal costs to a new low point.

Manufactured by

GENERAL DRY BATTERIES, INC.
Cleveland, Ohio

Distributors:
A. J. Johnson Elec. Co., Chicago, Ill.
W. S. Nott Company, Minneapolis, Minn.
Suttle Equipment Co., Lawrenceville, Ill.

from the commission and under the state public utility laws of 1913. Commissioners regarded the question an important one, since other cities and utilities in the state are affected in like manner.

The Portland city council, the city attorney stated, has exercised regulatory and police powers, reserved for it under the original franchise granted the company, by fixing rates at $1.75 for single party residence service. The Home Telephone Co., controlled by the Interstate Telephone Co., of which E. P. Goodrich is president, has asked that rates be increased to $2.75 on single residence lines.

The franchise given by the city was granted first to the Portland Telephone Co. in 1895, which transferred it to the United Telephone Co. in 1896, which transferred it to the Home Telephone Co. in 1902. Attorneys for the company called attention to a clause in the public utility statutes which gives the commission authority to fix emergency rates for any utility with the utility's consent and acting in the interests of patrons, business or the utility.

At a recent hearing in Portland, the company asked a valuation of $251,000 as a base for fixing rates. The city council there has obtained estimates from engineers on the cost of a municipal telephone system which approximates $68,000. Mr. Fleming said the citizens intend building their own system.

Commission to Make Valuation of Tri-State Properties.

The order requiring the Tri-State Telephone & Telegraph Co. of St. Paul, Minn., to show cause why it should not reduce telephone rates probably will be suspended for several months pending a valuation of the company's properties.

A valuation was agreed upon at a conference of members of the Minnesota Railroad & Warehouse Commission and the company, on September 16.

Engineers representing both organizations will cooperate in the valuation work which will require several months.

La Porte (Ind.) Case Postponed for Later Decision.

Once more the Indiana Public Service Commission is deadlocked over the disposition of a telephone case. After considerable discussion at its executive session September 27, the La Porte Telephone Co. case was not assigned. The matter was put off for decision later.

Twice the commissioners have refused an emergency rate raise to Ed. Kline, owner of the company. Now the company through his attorney has filed a new petition. This will make a rate permanent rather than temporary. Since Commissioner Frank Singleton heard the petition, which was refused twice, both the owner and his attorney want the new application assigned to some one else.

But, it is reported, Chairman John W. McCardle has promised Commissioner Singleton that he will receive all the La Porte telephone applications. At the last meeting he sought to pass the matter of assignment back on the other commissioners, in the hope that they would give it to Commissioner Howell Ellis, who did not take part in former La Porte rulings. The other commissioners balked and the matter now is at a standstill.

Southwestern Bell Authorized to Buy Missouri Properties.

The Scotia Telephone Co. was recently authorized by the Missouri Public Service Commission to sell all of its telephone property located at Mehlville, Oakville, Sappington and Fenton to the Southwestern Bell Telephone Co. for the agreed consideration of $75,000.

The Scotia Telephone Co. owns and operates exchanges known as Sappington, Mehlville, Oakville and Fenton, all located in St. Louis county. The petition asked for the approval of the purchase and sale of these four exchanges for a consideration of $75,000 to be paid in cash.

It was shown that the four exchanges named served 542 subscribers and that the reproduction cost new of the property, less depreciation, was $84,959. The commission found that there was apparently no opposition to the sale and transfer; that it was the general opinion that the transfer of the property would result in the public being benefited, and that in view of all the testimony offered, the sale should be approved.

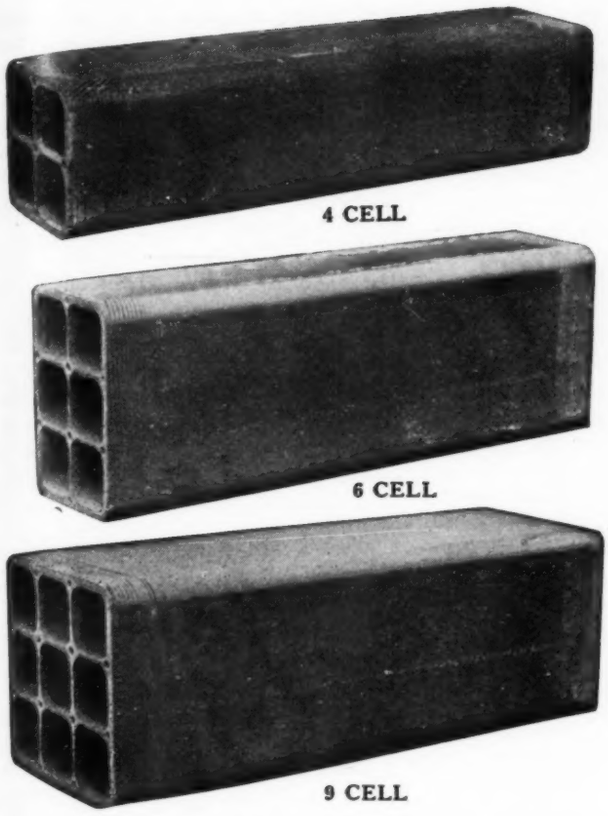
Organizes Company Into Which to Merge Nebraska Properties.

E. C. Hunt, who holds the controlling interest in the Blair Telephone Co., Blair, Neb., and has been one of the leading and progressive telephone men of that state, has purchased from the local owners the properties at Meadow Grove and Elgin. Mr. Hunt has organized the Citizens Telephone Co. of Blair, and into this he has put the Elgin exchange along with the exchanges he has operated at Morse Bluff, Prague, Weston and Malmo.

In an application filed with the Nebraska State Railway Commission he asks for authority to issue $57,000 worth of bonds, arrangements for the financing having been completed with an Omaha Trust Co.

Because of the haste necessary a hearing was held a few days later, and testimony taken. Mr. Hunt showed that the book cost of the consolidated properties was in excess of $114,000, and that the net revenues will take care of bond interest and leave a substantial surplus for dividend purposes. Bills payable were $18,000 and these will be cleaned up out of the proceeds.

The new company will have a capital stock of 1,000 shares of no par. Two of



There is Safety and Economy in Super Quality Vitrified Clay Conduit

SUPER Quality Vitrified Clay Conduit offers the safest and most economical protection for telephone cables that has been devised. The heavy exterior walls are moisture-proof and impervious to the action of acids, alkalis, gases or electrolysis.

Proper thickness of the web structure and thorough vitrification of all parts of the sections give unusual strength and permanence for underground construction. That is why many miles of Super Quality Vitrified Clay Conduit are encasing telephone lines in American cities.

Large stocks of all sizes are available to make prompt shipments at all times.

American Electric Company, Inc.
State and 64th Streets Chicago, Ill.
Distributors to the Independent Telephone Trade.

Manufactured by

Clay Products Company, Inc., of Indiana
BRAZIL, INDIANA

HAZARD
RUBBER INSULATED
WIRE & CABLE

Telephone Wire of Hazard quality

Every type from Drop Wire to Heavy Cable

HAZARD INSULATED WIRE WORKS
DIVISION OF THE OKONITE COMPANY
WORKS: WILKES-BARRÉ, PA.
NEW YORK CHICAGO PHILADELPHIA PITTSBURGH ATLANTA
ST. LOUIS BIRMINGHAM SEATTLE SAN FRANCISCO LOS ANGELES

Cope Specialties

- Conduit Cleaning Tools
- Concrete Cutters
- Cable Racks
- Cable Rack Arms
- Cable Reel Jacks
- Cable Drawing Guides
- Cable Drawing Protectors
- Cable Duct Shields
- Cable Pulling Rope
- Guard Rails

COPE Quick Coupling Conduit Rod is outstanding for its many salient features. It is designed for strength, durability and quick installation. They will not come uncoupled in the duct.

Send for copy of our new catalog.

T. J. COPE
Manufacturers of
Complete Equipment for Cable Installation
6120-6122 Vine Street, Philadelphia, Pa.
19 South La Salle Street, Chicago, Ill.

Mr. Hunt's sons are engaged in the telephone work with him, and his plans contemplate that he will give his main attention to the large plant that serves Blair and Kennard, and each of the two sons will assume charge of the other two companies he owns. The third one is the Northeast Telephone Co., with a number of small exchanges in the northeastern part of the state.

Tax Assessment Case Affecting Companies Before Court.

The Nebraska Supreme Court has advanced for hearing at the October 21 session the appeal of the cattle-growers from an increase of 10 per cent on the assessed valuation of all herds, made by the state board of tax equalization without notice to any person.

As this case involves the same point as raised in the controversies the telephone companies have engaged in with the state board, the decision in it will have much to do with what happens to the companies' appeals. The attorneys think that the requirement of the law that every citizen shall have the right to be heard when his valuation for tax purposes is raised and carries with it the necessity of notice, is plain enough to justify a belief that the board acted without authority.

Small Exchange Subscribers Approve Metallic Service.

The Nebraska State Railway Commission has granted the request of the Lincoln Telephone & Telegraph Co. for authority to change its exchanges at Colon, Mead, Cedar Bluffs, Ceresco and Ithaca from grounded to metallic service and to increase rates.

Before the application was made, the company canvassed the subscribers with respect to the proposal. It met with so generous a response that the commission decided a hearing was unnecessary and granted the applications the day after they were filed of record. At Ithaca the percentage of subscribers consenting was 81.8; at Colon, 78.5 per cent; at Cedar Bluffs, 74 per cent; at Ceresco 70 per cent, and at Mead 78 per cent.

The new rates authorized are: Business, individual, $3.25; residence, individual, $2.00, and residence, two-party, $1.75. The old rates were: Business, individual, $3.00; residence, individual, $1.50 and residence, two-party, $1.35. The company, with the cordial approval of the commission, is changing its small exchange service to metallic as fast as possible. This not only adds to the monthly revenues, but it gives much better service in those sections where power transmission lines are gridironing the countrysides.

The company was also given authority to put in the standard gross and net rates system to insure more prompt collection at the Burchard exchange, recently purchased. Heretofore, the local company had allowed a latitude that is not in consonance with modern methods of doing business.

Sold Property; Suit for Payment to State Supreme Court.

J. C. Belshe, former owner of the Bloomington Telephone Co. in Franklin county, has appealed to the Nebraska Supreme Court from a district court order denying him recovery of the balance of the purchase money. He tells that tribunal that he sold the property to Robert H. Miller for $8,000, part being paid down and the remainder in installments.

The latter, being desirous of making it a stock company, Mr. Belshe changed the form of the obligation for the balance due into a note for $3,579, which Mr. Miller signed. In the telephone corporation Mr. Miller took 84 shares and his wife 75 shares. Later they traded these shares to another man for a farm in Wichita county, Kan., and later this was exchanged for one in Franklin county, Neb. The title to the property was taken in the wife's name and when Mr. Belshe reduced the Miller note to judgment, the sheriff made a return that he could find no property upon which to levy in order to satisfy it.

Mr. Belshe then brought the present suit, claiming that the farm owned by the wife should be subjected to the payment of his judgment, but the district court held that she had given an adequate consideration for the interest in the telephone company that she purchased prior to making the land deal. The court upheld the contention of the wife, and on appeal Mr. Belshe says this is not sustained by the law and evidence.

Increase in Rates Granted West Virginia Company.

An increase in telephone rates requested by subscribers was granted recently by the West Virginia Public Service Commission to the United Telephone Co. of St. Marys. The increase was allowed with the provision that certain additions and improvements to the telephone system be made.

The new rate schedule, a petition for which was signed by the president of the board of trade and 51 other subscribers, affects only business telephones. The new business rates are: Individual line $4 a month, auxiliary business line $3 a month, two-party business line $3.25, four-party line $2.50, extension $1.

The rates that have been in effect up to the present time are: Business individual line $27 a year, two-party business line $20 a year, business and residence two-party line $18 a year, multi-party line $16 a year and extension, $8 a year.

Summary of Commission Rulings and Schedule of Hearings.

CALIFORNIA.

October 8: Hearing on application for 24-hour service by Morgan Hill Telephone Co. Morgan Hill is now without 24-hour service with Sunday and holiday service even further curtailed.

GEORGIA.

September 18: Central Telephone Co. of Georgia filed petition for authority to issue 500 shares of common capital stock and to execute 18 promissory notes of $25,000 in favor of W. R. Bowen and J. P. Manning, the proceeds to be used in the purchase of the properties of the Bowen Telephone Co., which serves Nashville, Ashburn, Sycamore and Rebecca.

INDIANA.

September 20: Idaville Cooperative

National Telephone & Telegraph Corporation
100 West Monroe Street
Chicago, Illinois

DIVIDEND NOTICE

The Board of Directors of National Telephone & Telegraph Corporation has declared the regular dividend of $1.75 per share on the First Preferred stock and 88c per share on the Class "A" stock for the quarter ending October 31st, 1929, payable November 1st, 1929, to stockholders of record at the close of business October 17th, 1929.

G. L. GRAWOLS,
Treasurer.

Northern **CEDAR POLES** Western
Large stocks at our Minnesota Transfer yard
Butt Treating **Guaranteed Grades**
Bell's PENTRATE. Guaranteed Half Inch or Full Sapwood Treatment
Bell Ships Quicker
Bell Lumber & Pole Co., Minneapolis, Minn.

EVER-PROTECT CABLE COMPOUND
EFFECTIVE *in maintaining your underground and aerial cable in perfect condition*
NATIONAL CABLE COMPOUND CO.
MITCHELL INC. INDIANA

Mentioning TELEPHONY gives your inquiry tone.

ZETKA
SPECIAL VACUUM TUBES

For the rigid requirements of Telephone Repeaters and Amplifiers, Special characteristics, together with longer life, insure a minimum "replacement" problem.

Grid, Plate and Filament are designed to produce *maximum* efficiency under actual operating conditions.

Zetka Special Tubes *cost* more—and are *worth* more.

Send us *your* specifications and operating conditions. We will be glad to cooperate with you to increase your efficiency.

Radio Utilities Corporation

67-73 Winthrop Street

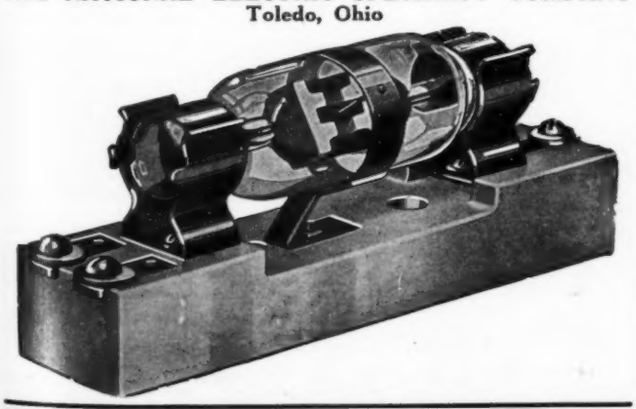
Newark, New Jersey

VAC-M
the sponsor of
PROTECTION

There has been a decided tendency in recent years for telephone companies to use VAC-M lightning arresters. There is a reason for this:—VAC-Ms protect service, operators and equipment from lightning, sneak currents and static. The initial cost of VAC-Ms is the only cost.

If you haven't protected your property with VAC-Ms your immediate investigation of them is warranted. They will render you the finest and most reliable protection obtainable.

THE NATIONAL ELECTRIC SPECIALTY COMPANY
Toledo, Ohio



Make Yourself Expert in Telephone Practice

These five great telephone books give you the best and most complete idea of what the telephony expert must know.

See them FREE for ten days

Mitchell's

Principles and Practice of Telephony

These five books place thousands of practical facts at your command for instant use.

Beginning with a comprehensive survey of the basic principles involved, the author discusses such subjects as telephone apparatus, circuit elements and analysis, typical cord combinations, telephone power plant equipment, coil winding, the toll switchboard and toll equipment in the multiple office.

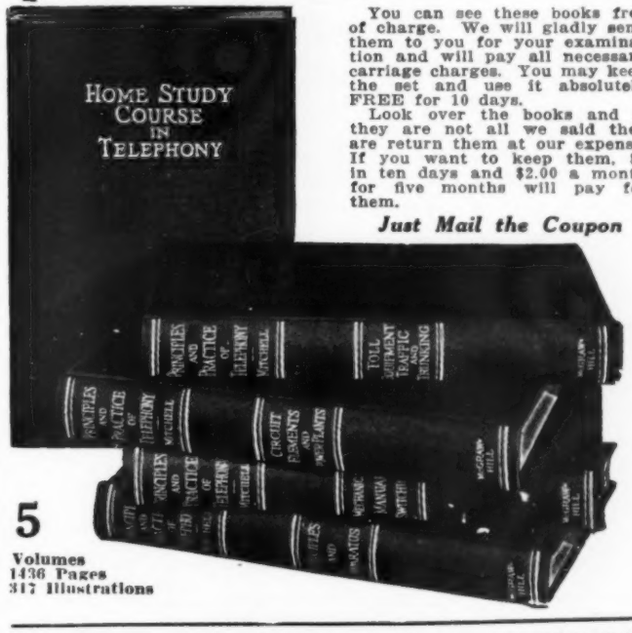
You learn about toll trunking, the nature and laws of telephone traffic, machine and automatic ringing, call distribution, trunk mechanical switching, mechanical-manual switching, etc.

All these subjects with scores of others, equally important, are treated in detail. Illustrations are used freely throughout the books, and a comprehensive index enables the reader to put his finger immediately on any desired fact.

To earn an expert's pay, you know that an expert's knowledge is necessary. With these books you get the combined experience of many telephone experts—down in black and white, with 317 illustrations to help you.

Examine this great set free

Nothing we could say about the Home Study Course in Telephony could possibly be as convincing to you as an actual inspection of the books themselves.



5
Volumes
1436 Pages
317 Illustrations

You can see these books free of charge. We will gladly send them to you for your examination and will pay all necessary carriage charges. You may keep the set and use it absolutely FREE for 10 days.

Look over the books and if they are not all we said they are return them at our expense. If you want to keep them, $2 in ten days and $2.00 a month for five months will pay for them.

Just Mail the Coupon

FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc.,
370 Seventh Ave., New York

Gentlemen:—Please send me MITCHELL'S PRINCIPLES AND PRACTICE OF TELEPHONY (shipping charges prepaid), for ten days' free examination. If satisfactory I will send $2.00 in ten days and $2 per month until $12.00 has been paid. If not wanted, I will write you for return shipping instructions. **(Please write plainly and fill in all lines.)**

Name .....

Home Address .....

City and State.....

Firm or Employer.....

Occupation .....

Tel. 10-5-29

Telephone Co. authorized to purchase the Idaville Cooperative Telephone Co. and increase rates for service. No opposition to increased rates was voiced.

September 21: Notice filed by city of Worthington that the city has taken an appeal from the commission's rate order of August 2 to the circuit court of Greene county, seeking an injunction against the increased rates made effective September 1. The city will attempt to block rate increases granted to the Southern Indiana Telephone & Telegraph Co.

September 27: Citizens Independent Telephone Co., Terre Haute, granted permission to issue $1,834 in stock to reimburse the company for retiring an equal amount of securities May 1.

September 27: Sullivan Telephone Co., Sullivan, authorized to issue $28,000 first mortgage bonds to retire old bonds.

October 2: Hearing on reopening of petition of the Decatur County Independent Telephone Co., Greensburg for an increase in rates.

KANSAS.

September 28: Complaint filed by patrons of Park vs. Kansas Telephone Co.

September 28: Plans, specifications and location of electric power transmission line of Kansas Power & Light Co. between Hoyt and Holton, approved, on condition that the company secure a separation between the transmission line and paralleled signal circuits not less than the width of the public highway; and that such paralleled signal circuits as are now operated grounded be made metallic by it where paralleled in excess of one-half mile. Company ordered to execute and file with the commission its agreement to remove, at its own expense, all interference with signal lines now constructed that may arise from the operation of the transmission line.

MARYLAND.

September 14: Complaint filed by city of Baltimore concerning service rendered by Chesapeake & Potomac Telephone Co. Complaint was made by R. K. Burner, telephone supervisor for the city, and characterized the service as inadequate and said the operators at various exchanges were slow and careless.

MICHIGAN.

September 17: Application denied of Citizens Telephone Co. of New Troy to

Valuation—Supervision—Plant—Inductive Interference
Expert Administrative Counsel for Utilities
JAY G. MITCHELL
TELEPHONE ENGINEER
Member A. I. E. E.
Member W. S. E.
1509 South Park Ave. Springfield, Ill.

Frank F. Fowle & Co.
Electrical and Mechanical
ENGINEERS
Monadnock Building CHICAGO

KEARNEY
Non-Chaffing
Cable Ring Saddles
5 Sizes
Main Office ST. LOUIS, MO.

CONSULTING
Telephone Engineer
GARRISON BABCOCK
1107 White Building
SEATTLE - WASHINGTON

J. K. JOHNSTON
TELEPHONE
JJK
ENGINEER
INDIANAPOLIS
During recent years I have been privileged to appraise Telephone Exchanges all over the United States. The list totals 663. Would you like to avail yourself of my services?
903-4 Lemcke Building

CONSULTING TELEPHONE ENGINEERS
W. C. POLK J. W. WOPAT
Plans, Estimates and Reports, Appraisal and Supervision
Can arrange a moderate amount of financing
406 West 34th St. Kansas City, Mo.

W. H. CRUMB
Telephone Engineer
9 South Clinton St. Chicago

J. G. WRAY & CO.
Telephone Engineers
Specialists in Appraisals, Rate Surveys, Financial Investigations, Organization, and Operation of Telephone Companies
J. G. Wray, Fellow A. I. E. E.
Cyrus G. Hill
2130 Bankers Bldg., Chicago

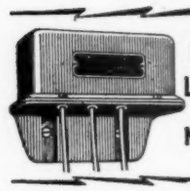
Diversified Investments Incorporated

Kansas City, Missouri

Notice of Special Dividend on Class A Stock

In addition to the regular quarterly dividend of $1.00 per share on the Class A Stock, an extra and participating dividend of 50 cents per share will be paid on October 15, 1929, to Class A stockholders of record on October 1, 1929, at 3:00 P. M.

V. E. CHANEY,
Vice-President.


CHAPMAN
LIGHTNING ARRESTERS
MADE BY
MINNESOTA ELECTRIC CO.
MINNEAPOLIS, MINN.

ACCOUNTING
HERDRICH AND BOGGS
Certified Public Accountants
Specializing on Public Utilities
901-7 Continental Bank Bldg.
Indianapolis, Indiana

Universal Insulators
will support your drop wires to your entire satisfaction and at a minimum cost. Are you a user? Samples free on request.
Universal Specialty Co.
711 Poplar Street
Terre Haute, Ind.

COFFEY SYSTEM & AUDIT CO.
CERTIFIED PUBLIC ACCOUNTANTS
Consolidated Bldg. Indianapolis, Ind
AUDITORS

THE BOWDLE SYSTEM
Always shows you where you stand. We have solved the bookkeeping problem of a large number of companies.
Write us about our monthly audit.
Bowdle Accounting Systems
Cerro Gordo, Illinois

KEARNEY
Solderless
Service
Connectors
For Telephone Service Taps
Main Office - - ST. LOUIS, MO.

Creosoted
CEDAR POLES
Prompt Shipment via Rail or Water
CASCADE TIMBER CO.
822 Tacoma Building Tacoma, Wash.

NAUGLE POLES
Northern and Western Cedar
Butt-treated or Plain
NAUGLE POLE & TIE CO.
59 East Madison St., Chicago

Northern Western
CEDAR POLES
A full assortment of sizes
Prompt Shipments Assured
T. M. Partridge Lumber Co.
Lumber Exchange MINNEAPOLIS

Creosoted Wood Conduit
Railroad Ties, Bridge Timbers, Piles, Poles, Paving Blocks and Lumber—Manufacturers of Cross Arms, Signal Trunking and Wyckoff Conduit for Underground Wires.
The Wyckoff Pipe & Creosoting Company
Established 1881
OFFICE: 522 5th Ave., N. Y. WORKS: Portsmouth, Va.

extend a single line into Chikaming township, a district now covered by the East Shore Telephone Co. of Lakeside. The Michigan Bell Telephone Co. also was ordered to remove its extension.

September 19: Application filed by Michigan Associated Telephone Co. for an increase in rates at Blissfield.

MISSOURI.

September 26: Hearing on application of Missouri Standard Telephone Co. for permission to establish toll rates in the Lake Taneycomo district. The company serves Hollister, Branson, Forsyth and Rockaway Beach. It maintains a central office at Branson. No toll charges are now in vogue, but the company contends it needs extra income to meet operating expenses.

NEBRASKA.

September 24: Application filed by Citizens' Telephone Co., of Blair, for authority to issue $57,000 worth of bonds to be used in financing purchases of properties, and hearing held.

September 25: Application of the Lincoln Telephone & Telegraph Co. for authority to establish gross and net rates at its newly-acquired exchange at Burchard; held to be reasonable, and authority asked for granted.

September 25: In the matter of the application of the Lincoln Telephone & Telegraph Co. for authority to change exchanges at Ithaca, Mead, Colon, Cedar Bluffs and Ceresco into metallic service, and to charge increased rates; it appearing that more than three-fourths of the subscribers affected have consented to such increase in view of the better service, it is held that no hearing is necessary, and authority granted as requested.

September 28: In the matter of the application of the Lincoln Telephone & Telegraph Co. for authority to increase its rates at its Wahoo exchange; it appearing that the rates asked for will give the company a net revenue less than that representing a fair return on the investment, held that no valuation of property is necessary, and that rates be granted as necessary for proper corporate purposes.

NEW YORK.

October 1: Hearing in the matter of the service rendered by the Black River Telephone Co. in the Old Forge, Eagle Bay, inlet, Raquette lake and Blue Mountain lake territory.

OHIO.

October 10: Hearing at Columbus relative to the Ohio Associated Telephone Co.'s application for increased rates. The rate question involved has been before the commission for several years. Pending its disposition the company has been collecting the increased rate under bond.

October 30: Final hearing on application of Warren Telephone Co. for increased rates.

WEST VIRGINIA.

September 14: Increased rates requested by subscribers granted to United Telephone Co. of St. Mary's, with the provision that certain additions and improvement to the telephone system be made. The new business rates are: Individual line, $4 per month; two-party line, $3.25; four-party line $2.50.

October 15: Hearing on application of Eglon Mutual Telephone Co., Eglon, for permission to increase its rate from $6 to $10 a year, so that it will be able to establish and maintain a metallic service.

WISCONSIN.

September 14: New Lisbon Mutual Telephone Co. authorized to issue 300 shares of common stock of the par value of $25 per share, making a total issue of $7,500.

The New FURNACE for the Telephone Industry

The Wall Big Brute DREADNAUGHT is a cable-splicing furnace of unusual merit. From tank to top-plate it is new in every detail, a radical departure from usual styles and specially designed for the extreme conditions of service in this field, insuring lowest possible maintenance costs. Get all the facts—write today for details of this latest "Service with Safety" Furnace.

P. Wall Mfg. Supply Co., 3126 Preble Ave., N. S., Pittsburgh, Pa.

The WALL BIG BRUTE DREADNAUGHT Splicers' Furnace

U

Are You Up to This Standard?

In past years inadequate public utility service in small communities was easily explained by the assertion that up-to-date methods and equipment could be expected only in centers of population. This is no longer true.

In rural communities of the present day, telephone service should not be allowed to fall below the standard set by larger centers. Are you fully prepared to give that quality of service? If not, let us present a plan that will help you.

Our free booklet, "A Complete Service," is sure to interest you.

PUBLIC UTILITIES DEPT.

The United Trust Company

ABILENE, KANSAS

Mentioning TELEPHONY gives your inquiry tone.

OPPORTUNITIES!

Rates 10 cents per word, payable in advance. Minimum charge $2.00 for 20 words or less.

"REBUILT" TELEPHONE APPARATUS

and exchange equipment saves you 30 to 50 per cent—quality and efficiency guaranteed.

EVERYTHING YOU NEED

for the installation and operation of a complete exchange—Magneto or Central Energy.

TWENTY YEARS' SUCCESSFUL OPERATION

of our "Rebuilt" Equipment Department puts it past the experimental stage. Ask for our Free No. 78 Bargain Bulletin.

ADDRESS

"Rebuilt" Equipment Department

Premier Electric Company

Chicago, Ill.

"REBUILT" when connected with PREMIER means something.

RECONSTRUCTED EQUIPMENT

Am. Elec. No. 36 type 4-bar 1000 or 1600 ohm Bdg. compacts with Kellogg Transmitters @	$ 6.50
Automatic Elec. Receivers, complete with cord @	1.10
Automatic Elec. 2 M. F. Twin Condensers (2-2-MF in one can) @	.50
Western Elec. No. 46 or Kellogg No. 79 C. B. Ind. Coils @	.50
24-volt Swbd. lamps, per 100 @	8.00
Garford C. B. Steel hotel set with balance coil talking Ckt. equipped with Straight line or 16-33-50 and 66 cycle ringers @	5.00
Kellogg drop coils, 100 ohm 35c ea., 500 ohm 45c ea., 1000 ohm	.55
Dean 3-bar 1000 or 1600 ohm Bdg. desk set with inside connection signal set @ $9.00—4-bar $9.50—5-bar @	10.00
Kellogg No. 28 3-bar 1000 or 1600 ohm Bdg. desk set with inside connection signal set @ $10.00—4-bar $10.75—5-bar @	11.50
Kellogg No. 97 C. B. desk sets with No. 404 Straight line steel signal sets @	7.00

Write for Our Bulletin

REBUILT ELECTRIC EQUIPMENT CO. Not Inc.

1940 W. 21st St., Chicago

WANTED TO BUY

WANTED TO BUY—Western Electric Harmonic Telephones. George B. Quatman, 122 So. Elizabeth Street, Lima, Ohio.

WANTED for cash, 1000 to 5000 No. 9 Pony or No. 12 or similar glass or porcelain insulators. Reused material but must be in good shape. Advise best price. Address 7583, care of TELEPHONY.

HELP WANTED

WANTED—An experienced telegraph and telephone equipment supervisor. Man capable of handling layout work desired. State experience, age, education and salary. Address 7581, care of TELEPHONY.

WANTED—Experienced telephone man; must be good, fast worker, steady, sober—must know both line instruments and switchboards and can cultivate good, public relations—build up plant and business; in Kansas. Address 7580, care of TELEPHONY.

WANTED—Telegraph Engineer, college or technical school graduate experienced in the design of simplex, multiplex or teletype circuits. Apply by letter stating full details with references and salary expected. Address 7571, care of TELEPHONY.

WANTED

WANTED—From owner or broker, group, or properties which may be grouped. Cash basis—quick action. Address 7567, care of TELEPHONY.

RINGERS

NEW Stromberg-Carlson late type Code 46-F, 2500 ohm $1.00

Same, with gongs, screws and nuts 1.25

REBUILT Dean Electric Co. 30-42 and 54 cycle harmonic ringers 1.00

Buckeye Telephone & Supply Company

1432 S. Parsons Ave.
COLUMBUS, OHIO

The advertisers on this page will render you prompt, efficient service

FOR SALE

W. E. 24-VOLT switchboard lamps @ $10.00 per 100. Bakelite mouth-pieces for W. E. Transmitters @ $6.00 per 100. Armatures for W. E. No. 22 generators @ 75c, for W. E. No. 47 generators @ $1.00, for W. E. No. 48 generators @ $1.25. Monarch Ring, Listen and Ring-back Keys @ $1.00. No. 17 parallel bronze drop wire @ $6.50 per 1000 feet. **The TELEPHONE REPAIR SHOP** 6966 Ravenswood Ave., Chicago.

FOR SALE—Cook No. Ten Arrestors, perfect condition, complete with heat coils and carbons; 20 pr. banks, $3.50 each. Sample for approval. Whittier Home Tel. & Tel. Co., Whittier, Calif.

FOR SALE—A 240 Station Exchange; price $4,000.00 Have 3 more. Address L. Q. Adamson, Purdy, Mo.

FOR SALE—150 3-4 & 5 bar 1000 & 1600 ohm Monarch wall telephones @ $9.00 to $10.00. A few 3 bar 1000 ohm Kellogg wall telephones @ $9.00. A few 3 bar 1000 ohm Kellogg desk telephones @ $9.50. 50 Monarch 3 & 4 bar 1000 & 1600 ohm Desk sets @ $9.50 to $10.50—rebuilt and guaranteed to look and work as good as new, by the Oldest and Only Commercial Telephone & Repair Shop west of the Mississippi river. DYVIG ELEC. SHOP, Inwood, Ia.

FOR SALE—Type H Wireless Cable Testers, $18.50 complete with exploring coil and receiver, new, guaranteed, why pay more? Electric Specialty Co., Box 645, Cedar Rapids, Iowa.

FOR SALE—Small exchange located in Wisconsin, about 50 miles east of St. Paul, one hundred forty telephones owned, switch 50, good condition. Priced for quick sale; ideal for man and wife. Address 7576, care of TELEPHONY.

FOR SALE—8 No. 84-D Ringing Interrupters in good condition. Address F. M. Strasser, 14th & M Sts., Lincoln, Nebraska.

FOR SALE—100 Kellogg No. 118 and 50 Kellogg No. 97 desk stands $3.50 each, like new. CORWIN ELECTRIC CO., Indianapolis, Ind.

POSITIONS WANTED

POSITION WANTED as wire chief, by young man with six years' experience in telephone work. Some experience in cable splicing. References. Address 7579, care of TELEPHONY.